Final Environmental Impact Report - EEA No. 15283

Merrimack Valley Reliability Project

Tewksbury, Andover, and Dracut, Massachusetts

PREPARED FOR

nationalgrid

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d/b/a National Grid
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January 15, 2016

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January 15, 2016

Ref: 12650.00

Secretary Matthew Beaton
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office; **EEA File No. 15238**
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Final Environmental Impact Report: Merrimack Valley Reliability Project

Dear Secretary Beaton:

We are pleased to submit the Final Environmental Impact Report ("FEIR") for the Merrimack Valley Reliability Project on behalf of New England Power Company d/b/a National Grid. Two copies are enclosed for the MEPA record. Additional copies have been sent to all parties specified in Section 11.16 of the MEPA regulations and to persons and agencies who previously commented on the Environmental Notification Form ("ENF") or Draft Environmental Impact Report ("DEIR") and to the Tewksbury, Andover, and Dracut public libraries as required by the Secretary's Certificate on the DEIR. If additional public copies are required, requests may be sent to Marc Bergeron at mbergeron@vhb.com or made by phone to 508.752.1001.

We look forward to working with the MEPA Office to address any further questions or comments and to complete the State environmental review for the Project.

Sincerely,
VHB

Marc Berg

Marc Bergeron, PWS

Senior Project Manager
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General

This Final Environmental Impact Report (the "Final EIR" or "FEIR") responds to the Secretary of Energy and Environmental Affairs (the "Secretary") October 16, 2015 Certificate ("Secretary's Certificate") on the Draft Environmental Impact Report ("Draft EIR" or "DEIR") for the Merrimack Valley Reliability Project ("MVRP" or the "Project") located in Tewksbury, Andover, and Dracut, Massachusetts (EEA No. 15283). This Final EIR addresses the scope issues articulated in the Secretary's Certificate.

The Chapters of this Final EIR are named and presented in the same manner as presented in the SCOPE portion of the Secretary's Certificate on the Draft EIR, as follows:

- Chapter 1 – General
- Chapter 2 – Land Alteration
- Chapter 3 – Wetlands and Stormwater
- Chapter 4 – Chapter 91
- Chapter 5 – Rare Species
- Chapter 6 – Mitigation and Section 61 Findings
- Chapter 7 – Response to Comments/Circulation

Each chapter of the Final EIR begins with the full content of the Secretary's Certificate for that particular "SCOPE" item.

The Final EIR has been completed in accordance with the guidelines provided in Section 11.07 of the Massachusetts Environmental Policy Act ("MEPA") regulations.

From the Secretary's Certificate on the DEIR

General

The FEIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by this scope. The FEIR should identify any changes to the project since filing of the DEIR and review the project's compliance with applicable regulatory standards. The primary emphasis of this Scope is on addressing information and analysis of land alteration and wetlands that was not provided in the DEIR. I expect that the FEIR will be responsive to the Scope below. If it is not, a Supplement FEIR may be required.

Project Name

Merrimack Valley Reliability Project

■

EEA Number

15283

■

Proponent

New England Power Company d/b/a National Grid ("NEP")
40 Sylvan Road
Waltham, Massachusetts 02451

■

Project Location

357 Old Boston Post Road in Tewksbury and existing transmission rights-of-way in the towns of Tewksbury, Andover, and Dracut, Massachusetts

■

Watershed

Shawsheen/Merrimack

Project Description

The Merrimack Valley Reliability Project ("MVRP") involves the construction of a new 345 kV electric transmission line (the "3124 Line") within an existing right-of-way ("ROW") between the NEP-owned Tewksbury #22A Substation in Tewksbury, Massachusetts, and the Scobie Pond Substation in Londonderry, New Hampshire, owned by the Public Service Company of New Hampshire d/b/a Eversource Energy ("PSNH"). The 3124 Line is approximately 24.4 miles long in total and is located in the towns of Tewksbury, Andover, and Dracut in Massachusetts, and in the towns of Pelham, Windham, Hudson, and Londonderry in New Hampshire. This FEIR describes the portion of the MVRP that lies within Massachusetts and falls within the scope of MEPA review (the "Project").

The Project begins at the Tewksbury #22A Substation in Tewksbury and continues northward within an existing ROW for approximately 0.3 miles before joining what is known as the "Fifteen Mile Falls ROW."[1] It continues in a northeasterly direction for 6.2 miles in the Fifteen Mile Falls ROW to the Massachusetts/New Hampshire border. Please refer to Figure 1.1 depicts the Project site. At any given point, there are up to five existing transmission lines within this segment of the Fifteen Mile Falls ROW, including one, 345-kV line, two, 230-kV lines, and two, 115-kV lines; in some locations additional distribution circuits are also located within the ROW (collectively, the "Existing Lines").[2] The width of the ROW in Massachusetts varies from 225 feet to 520 feet. Reconfiguration of portions of the Existing Lines within the ROW is required along most of the length of the Project to accommodate the 3124 Line.

The Project also includes reconductoring of the 115 kV Y-151 Line within the same ROW. This component of the Project will replace that transmission line with higher capacity conductors between a location just north of Wheeler Road in Dracut, Massachusetts, referred to as Dracut Junction, and the point of ownership transfer between NEP and PSNH in Hudson, New Hampshire.[3]

NEP is required to meet reliability standards and criteria established by the North American Electric Reliability Corporation ("NERC"), the Northeast Power Coordinating Council, and the Independent System Operator of New England ("ISO-NE"). The installation of this new 3124 Line would relieve potential contingency overloads under various conditions on several elements of the transmission system. In doing so, the Project ensures continued compliance with all applicable federal and regional transmission system reliability standards and criteria, and maintains reliable service to customers.

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[1] The Fifteen Mile Falls ROW extends from Tewksbury #22 Substation to the substation at Comerford Dam near the Vermont/New Hampshire border, in the Fifteen Mile Falls section of the Connecticut River.

[2] The 1302, 62L2, and 75L2 distribution circuits are all located within some portion of the Fifteen Mile Falls ROW; however, there is only one distribution circuit on the ROW at any particular location.

[3] Although the reconductoring is being described as part of the MVRP, it is an upgrade to the regional transmission system that would be required regardless of whether the 3124 Line is constructed. Because the Y-151 Line and the 3124 Line occupy the same ROW, the work will be accomplished simultaneously.

Project Changes since the Filing of the DEIR

There have been no significant modifications to the Project since the filing of the DEIR.

Project Permitting and Compliance

The alteration of wetland resource areas requires permits under Sections 401 and 404 of the Clean Water Act, and the crossing of the Merrimack River will require authorization under Section 10 of the Rivers and Harbors Act and Chapter 91 (the Massachusetts Public Waterfront Act). A full discussion of compliance with the applicable wetlands and waterways regulations is provided in Chapter 4.

The Project will pass through areas of Priority Habitat ("PH") and Estimated Habitat ("EH") of rare and endangered species mapped by NHESP. The Project is also subject to review by the USFWS under Section 7 of the federal Endangered Species Act, and consultations with USFWS have indicated that the Project will have No Adverse Effect for the Northern Long Eared Bat and that no further action is required. NEP will continue to coordinate with NHESP to avoid, minimize, and mitigate impacts to rare species; a more detailed discussion is provided in Chapter 5 and Attachments D and E.

The Project requires permits from the United States Army Corps of Engineers ("USACE" or "ACOE") under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, it is also subject to review under Section 106 of the National Historic Preservation Act ("Section 106"). In addition, the Project is subject to review by the MHC under G.L. c. 9 §§ 26–27C. NEP has coordinated with both the USACE and Massachusetts Historical Commission ("MHC") to avoid adverse effects to eligible and potentially eligible historic and archaeological resources. As part of its Section 404 permit review and pursuant to Section 106, the USACE has consulted with Native American tribes that express an interest in the historic and archaeological resources that may be affected by portions of the Project subject to Section 106 jurisdiction.

Table 1-1 lists the permits and approvals that will be required for this Project and their status. The Project will not receive financial assistance from the Commonwealth or require a transfer of land from the Commonwealth.

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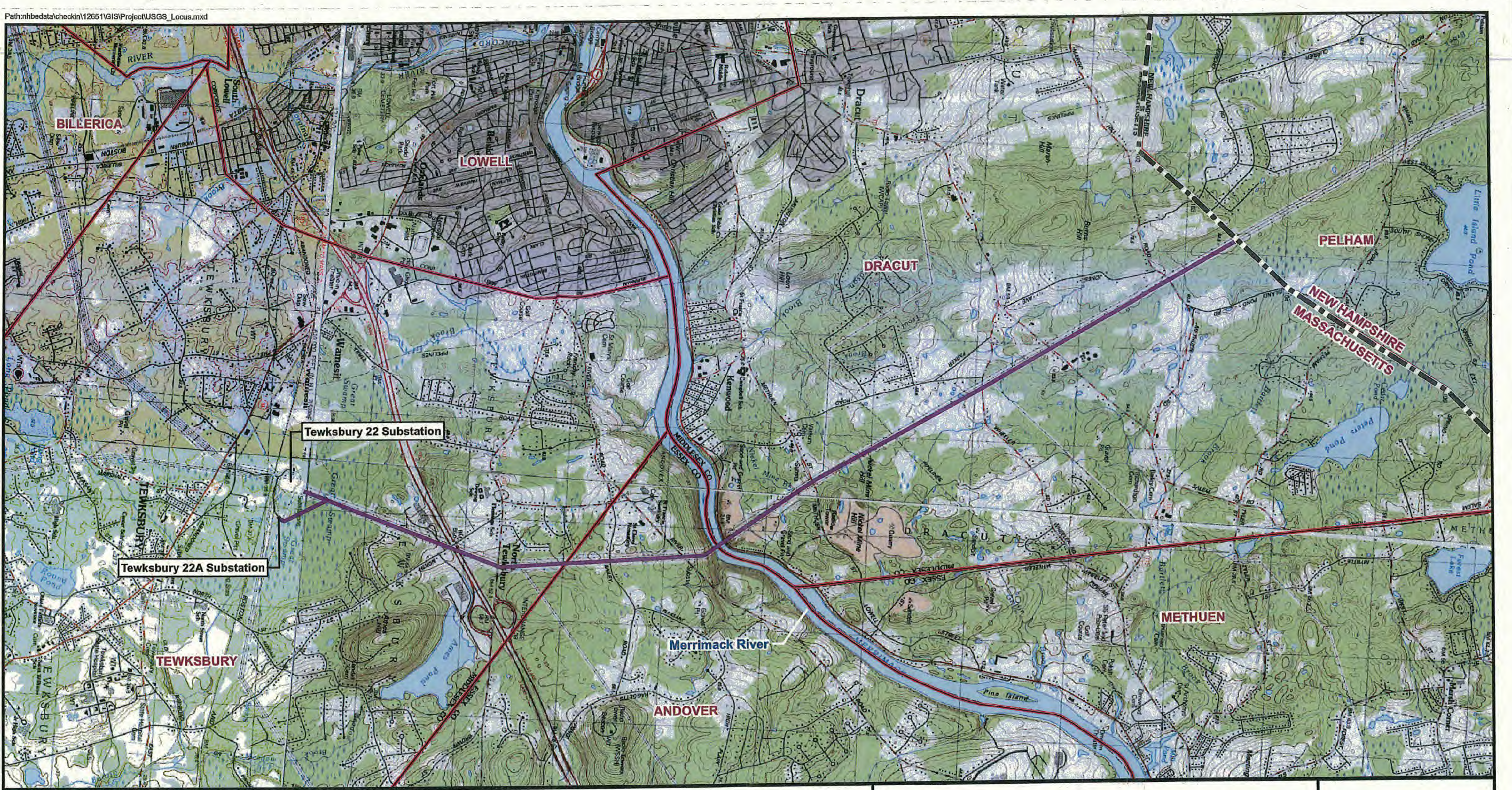

▬ Project Location
▭ Town Boundary
▢ State Border

Source:
MASSGIS

Merrimack Valley Reliability Project

Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

Figure 1.1: USGS Locus

nationalgrid

vhb

THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE

Table 1-1: Required Permits and Approvals

Agency	Permit/Approval	Status
FEDERAL		
USACE	US Clean Water Act: Section 404 Massachusetts General Permit	Application filed October 2015
	Rivers and Harbors Act: Section 10 Individual Permit	Application filed October 2015
	Review under Section 106 of the National Historic Preservation Act	MHC issued a letter on October 14, 2015 indicating that no further archaeological survey is recommended for Army Corps portions of the Project; the letter also states that no historic properties will be affected by the Project. USACE concurs with the no effect determination and has concluded the Section 106 process.
US Fish and Wildlife Service	US Endangered Species Act: Section 7 Consultation	USACE sent an email on December 2, 2015 indicating that USFWS concurred with their determination of No Adverse Effect for the Northern Long Eared Bat and that no further action is required.
US Environmental Protection Agency	US Clean Water Act: National Pollution Discharge Elimination System General Permit for Stormwater Discharge from Construction Activities	To be filed 30 days prior to construction
Federal Aviation Administration	Notice of Proposed Construction or Alteration	To be filed in April 2016
STATE		
Natural Heritage and Endangered Species Program ("NHESP")	Review under the Massachusetts Endangered Species Act (G.L. c. 131A)	MESA Checklist recently filed in January 2016. NEP is working with NHESP to avoid a "take" of rare species.
Executive Office of Energy and Environmental Affairs	Massachusetts Environmental Policy Act (G.L. c. 30 § 61–62H) Review, Mandatory EIR	ENF filed 11/17/14. Certificate on ENF issued 12/24/14. Draft EIR submitted 8/28/15. Certificate on the DEIR issued on October 16, 2015. FEIR to be filed on or around 01/15/16.
Massachusetts Department of Environmental Protection ("MassDEP")	Massachusetts Clean Waters Act (G.L. c. 21 § 26–53) Individual 401 Water Quality Certificate Massachusetts Public Water Front Act (G.L. c. 91) Waterways Authorization	Application filed October 2015. Notice of Minor Project Modification submitted to MassDEP on November 6, 2015. On January 7, 2016 DEP issued a letter indicating that the Project activity constitutes a minor project modification, and that the proposed activity does not require a license.
Department of Public Utilities	Petition to Construct (G.L. c. 164 § 72); Zoning Exemption (G.L. c. 40A § 3)	Filed April 2015
Massachusetts Historical Commission ("MHC")	Project review (G.L. c. 9 § 26–27C); Consultation with USACE under National Historic Preservation Act: Section 106 Review	Project review under G.L. c. 9 ss. 26-27C and consultation under Section 106 have been completed.
Massachusetts Department of Transportation	Construction Access Permit (Aerial Crossing and Road Opening)	To be filed in April 2016

Table 1-1: Required Permits and Approvals (Continued)

Agency	Permit/Approval	Status
LOCAL		
Tewksbury		
Conservation Commission	Massachusetts Wetlands Protection Act (G.L. c. 131, § 40) / Local Wetlands Bylaw Order of Conditions	To be filed in January 2016
Board of Selectmen	Street Crossings (G.L. c. 122 § 22)	To be filed in February 2016
Andover		
Conservation Commission	Massachusetts Wetlands Protection Act (G.L. c. 131, § 40) / Local Wetlands Bylaw Order of Conditions	To be filed in January 2016
Board of Selectmen	Street Crossings (G.L. c. 122 § 22)	To be filed in February 2016
Dracut		
Conservation Commission	Massachusetts Wetlands Protection Act (G.L. c. 131, § 40) / Local Wetlands Bylaw Order of Conditions	To be filed in January 2016
Board of Selectmen	Street Crossings (G.L. c. 122 § 22)	To be filed in February 2016

Design Standards and Regulatory Compliance

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Design Standards

The minimum required separation between conductors of transmission circuits, both conductors of the same circuit and conductors of different circuits, is set forth in 220 C.M.R. 125.23 and Section 23 of the 2012 National Electrical Safety Code ("2012 NESC"). These minimum requirements form the basis of design for the spacing of conductors, the supporting structures for a particular circuit, and between supporting structures of different circuits. Generally, conductors must be separated by more than the minimum required by code in order to reduce the probability of storm-related contacts between the conductors and to enable future maintenance.

NERC is required by Section 215 of the Federal Power Act to develop mandatory and enforceable reliability standards. This includes Transmission Vegetation Management Standards, which are outlined in NERC's FAC-003-3 Electric Reliability Standard. This document establishes Minimum Vegetation Clearance Distances with which utilities must comply at all times to prevent "flash-over," in which an arc of electricity jumps to the nearby vegetation, potentially causing a loss of transmission to customers or a fire in the tree. Prudent vegetation management practices dictate that trimming should occur beyond the minimum clearance to account for the fact that vegetation will continuously grow and sway in the wind, and to account for power line sagging due to high usage, heat, or snow/ice buildup.

As described below, NEP will design, build, and maintain the facilities for the Project in accordance with all federal, state, and local regulations, including Sections 401 and 404 of the Clean Water Act, the Massachusetts Wetland Protection Act ("MWPA"), and the local wetland protection bylaws of Tewksbury, Andover, and Dracut.

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Regulatory Compliance

Section 401 of the Clean Water Act

Section 401 of the federal Clean Water Act requires that anyone proposing activities that result in a discharge to waters or wetlands subject to federal jurisdiction obtain state certification that the Project will comply with state water quality standards. In Massachusetts, MassDEP is the granting authority that implements regulations pursuant to Section 401. The purpose of the 401 Water Quality Certification ("WQC") is to certify that discharges of dredged or fill material comply with the Surface Water Quality Standards at 314 C.M.R 4.00. Pursuant to the WQC regulations at 314 C.M.R 9.00, an individual WQC is required because alterations associated with the Project include both temporary and permanent fill that cumulatively will be greater than 5,000 square feet.

The regulations at 314 C.M.R 9.06(2) require that the Project avoid, minimize, and mitigate adverse impacts to wetlands, including a minimum of 1:1 restoration or replication. The Project has been designed to avoid and minimize wetland impacts, and the use of swamp mats and BMPs used during construction will ensure that the Project meets surface water quality standards at 314 C.M.R 4.00. Wetland replication at a ratio of 2:1 is proposed in order to mitigate for unavoidable wetland impacts. A joint Section 401/404 application was filed with MassDEP and the USACE in October 2015.

Section 404 of the Clean Water Act

Section 404 of the federal Clean Water Act regulates activities in federal wetland resource areas. The regulations are implemented by the New England District of the USACE. During a pre-application meeting on March 30, 2015, the USACE indicated that the Project will qualify for coverage under the Massachusetts General Permit. Since the amount of construction matting necessary for the Project will exceed the Self-Verification limit of 5,000 square feet, the Project will require a Pre-Construction Notification. The General Conditions of the General Permit require that the Project comply with the following:

- Compensatory mitigation will generally be required for permanent impacts that exceed the Self-Verification ("SV") area limits (5,000 square feet), and may be required for temporary impacts that exceed the SV area limits. Temporary impact work with no secondary effects may generally be excluded from this requirement.
- The Project shall not have effects on historic properties listed or eligible for listing on the National Register without completing the Section 106 process.
- The Project shall not have effects on federally threatened or endangered species.

- The Project shall not result in unreasonable interference with navigation, and shall not prevent the full and free use by the public of all navigable waters.
- Heavy equipment must be placed on swamp mats or be operated on adequately dry or frozen wetlands to minimize disturbance of wetland soil or vegetation. No such equipment other than fixed equipment (drill rigs, fixed cranes, etc.) shall be stored, maintained, fueled, or repaired in wetlands unless the equipment is broken down and cannot be easily removed or unless it is more environmentally damaging to do otherwise.
- Soil erosion and sediment controls must be used and maintained in effective operating conditions during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date. These controls shall be removed promptly upon completion of work once all disturbed areas are permanently stabilized.
- Mats shall be placed in the wetland from the upland or from equipment positioned on construction mats if working within a wetland. Construction mats should be managed in accordance with the USACE's Construction Mat BMPs.
- Work shall include phased or staged development to ensure only areas under active development are exposed and to allow for stabilization practices as soon as practicable, typically within three calendar days after disturbance.
- Temporary crossings of wetlands shall be suitably culverted, spanned, or bridged in such a manner as to preserve hydraulic and ecological connectivity between the wetlands on either side of the road. The Project must not restrict or impede the passage of normal or high flows in streams.
- Applicants must satisfy any conditions imposed by the State, where applicable, in its Clean Water Act Section 401 WQC.
- Activities in waters of the US that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
- Direct, secondary, and cumulative adverse effects to all vernal pools, including their 100-foot envelopes and 750-foot critical terrestrial habitats, shall be avoided and minimized to the maximum extent practicable.
- The introduction or spread of invasive species on the Project site or areas adjacent to the Project caused by the site work shall be avoided to the maximum extent practicable; mats shall be cleaned before and after use.

In order for authorization under the General Permit to be valid for this Project, the following state approvals/reviews must be obtained prior to the commencement of work:

- Compliance with the MWPA based on coordination and determinations from the Tewksbury, Andover, and Dracut Conservation Commissions
- 401 Water Quality Certification from MassDEP
- Chapter 91 - Notice of Minor Modification

The Project has been designed to minimize wetland impacts, and the use of swamp mats and BMPs during construction will ensure that the Project meets the standards required under the General Permit. If matting or spanning is required at streams, the crossings will comply with the "Temporary Crossings in Non-Tidal Streams" section of the Massachusetts River and Stream Crossing Standards. The USACE will coordinate review with other federal and state agencies as appropriate to ensure that issuance of the General Permit will not result in more than a minimal impact to the aquatic environment. NEP's proposed wetland mitigation strategy is summarized in Chapter 3.

Massachusetts Wetlands Protection Act and Local Bylaws

Under the MWPA, the Project may be permitted as a Limited Project pursuant to 310 C.M.R. 10.53(3)(d), which allows for the construction, reconstruction, operation and maintenance of overhead public utilities, such as electrical distribution or transmission lines, in accordance with the following general conditions and any additional conditions deemed necessary by the issuing authority:

- the issuing authority may require a reasonable alternative route with fewer adverse effects for a local distribution or connecting line not reviewed by the Energy Facilities Siting Board;
- best available measures shall be used to minimize adverse effects during construction; and
- the surface vegetation and contours of the area shall be substantially restored.

The issuing authorities (local Conservation Commissions and MassDEP) may issue Orders of Conditions for the Project and "impose such conditions as will contribute to the interests identified in M.G.L. c. 131, § 40." Other performance standards may be waived; however, the Project will be designed to meet the MWPA performance standards to the maximum extent feasible. The Project will also be designed to meet the requirements of the local wetland bylaws of Tewksbury, Andover, and Dracut to the maximum extent feasible, though some performance standards may need to be waived. Details of the construction methods and proposed measures to avoid, minimize, and mitigate wetland impacts are provided in Chapter 3.

Chapter 91 Licensing

A portion of the Project crosses the Merrimack River and is subject to Chapter 91 jurisdiction as a water-dependent Project. The Public Waterfront Act and its regulations (310 C.M.R 9.00) require that authorization be obtained from MassDEP for structures and uses located in, under, or over the non-tidal portion of the Merrimack River (310 C.M.R 9.04(1)(d)). In this case, only the conductors and shield wire associated with the circuits are within Chapter 91 jurisdiction; there are no new structures located within the jurisdictional area and no in-water work is required. There are already licensed crossings in this location, and as detailed in Chapter 4, the Project will result in an insignificant deviation from existing, licensed conditions. There are already licensed crossings in this location, and as detailed in Chapter 4, the Project will result in an insignificant deviation from existing, licensed conditions. NEP submitted a Notice of Minor Modification to MassDEP on November 6, 2015 (see Attachment B). By letter dated January 7, 2016, MassDEP concurred that the Project could proceed as a minor modification of existing licenses and no additional license or license amendment was required.

NPDES and Massachusetts Stormwater Regulations

The Project has been designed to comply with the applicable MassDEP Stormwater Management Standards (2008) and applicable town stormwater and erosion control regulations. Additionally, the Project will result in more than an acre of land disturbance and will require coverage under the National Pollutant Discharge Elimination System ("NPDES") Construction General Permit. A Storm Water Pollution Prevention Plan ("SWPPP") will be prepared and a Notice of Intent submitted to the USEPA in accordance with permit requirements. Throughout the construction process, the Proponent will retain the services of an environmental monitor to ensure compliance with all federal, state, and local permit requirements and NEP policies. At regular intervals and during periods of prolonged precipitation, the contractor and/or monitor will inspect all locations to determine that erosion controls and other environmental controls are functioning properly and make recommendations for correction or maintenance as necessary.

In addition to retaining the services of an environmental monitor, the Proponent will require the construction contractor to designate a construction supervisor or equivalent to be responsible for the daily inspection and upkeep of environmental controls. This person will also be responsible for providing direction to the other members of the construction crew regarding compliance with regulatory requirements and NEP policies as well as appropriate work methods. Additionally, construction personnel will be trained on these requirements and policies prior to the start of construction. The Proponent will conduct regular construction progress meetings to reinforce the contractor's awareness of these obligations.

2

Land Alteration

From the Secretary's Certificate on the Draft EIR

> *Land Alteration*
>
> *The FEIR should describe the extent of tree removal and conversion. Tree clearing and other vegetation removal should be clearly described and identified on project plans and the type and extent of restoration efforts should be described and identified.*

Introduction

This Chapter provides a summary of proposed tree clearing activities along the existing electrical transmission right of way (ROW).

Tree Clearing Activities

At most locations, the ROW is cleared to nearly its full extent. The width of the existing ROW varies between 225 and 520 feet. However, there are some limited locations where this is not the case and tree removal will be required along the edge of the ROW. The locations of tree removal are shown in the plans provided in Attachment A. The most substantial contiguous area to be cleared is located between the Tewksbury #22 Substation and I-495. The locations designated for clearing in this area are either adjacent to non-residential parcels or are on the opposite side of the ROW from residential abutters. Table 2-1 provides a summary of all tree clearing activities in both wetland and upland areas.

Table 2-1: Tree Clearing

Resource Area	Amount
Total Project Area (i.e., ROW)	**14,679,720 sf (337 ac)**
Project Total Tree Clearing	278,637 sf (6.39 ac)
BVW Tree Clearing (PFO to PSS)	100,287 sf (2.30 ac)
Upland Total	178,308 sf (4.09 ac)
Uplands within 100 ft of streams	5,843 sf (0.13 ac)
Uplands within 100 ft Buffer Zone of BVW	58,847 sf (1.40 ac)

Mowing and maintenance of the ROW will take place prior to construction in accordance with NEP's Commonwealth-approved Five-Year Vegetation Management Plan (VMP) 2014-2018. Prior to tree removal and mowing, the boundaries of wetlands will be clearly marked to prevent unauthorized vehicular encroachment into wetland areas. Temporary swamp mats may be used to gain access to and across forested wetlands, to prevent wetland disturbance, and to provide stable platforms for equipment operation. Any equipment or timber mats that have been used in areas containing invasive species will be cleaned of plant matter and soil prior to being moved to other areas. Crews will be provided training on permit requirements prior to the start of construction.

Tree removal operations, where required, will include the removal of all tall-growing woody species within the targeted areas on the ROW. Tall-growing trees just outside the maintained ROW edge will be assessed for their potential to damage the transmission lines. To ensure reliability, these "danger trees" may have to be pruned or topped off. In addition, there will be selective trimming to facilitate sight lines for wire pulling during construction.

Generally, trees to be removed will be cut close to the ground, leaving the stumps and roots in place, except where grading is required for access improvements or at sites of structure installation where grubbing may be required. Small trees and shrubs within the ROW will be mowed as necessary with the intent of preserving roots and low-growing vegetation to the extent practical. Where construction mats are required to provide safe access across wetlands, the mats will typically be installed on top of the brush rather than removing the vegetation. Upon removal of the mats, vegetation will typically return to its prior conditions within the growing season. At streams and brooks, vegetation along the stream bank will be selectively cut to minimize the disturbance of bank soils and the potential for construction-related erosion.

Brush, limbs, and cleared trees will either be chipped and removed from the site or left in place, depending on land conditions, permitting requirements, and landowner preference. In certain environmentally sensitive areas such as wetlands, felled trees and snags may be left to decompose in place to avoid disturbing saturated soils and to provide wildlife habitat. Where appropriate, enhancements will be proposed as mitigation for important wildlife features that may be lost as a result of tree removal and construction activities. Potential enhancement activities may include seeding, planting of native shrub species, and provision of snags, woody debris, and stone piles to create wildlife cover. These potential wildlife enhancement measures will be discussed with MassDEP 401 Water Quality Certificate personnel and with the local Conservation Commissions and incorporated in the conditions required of those permits.

Please refer to Chapter 3 for more information pertaining to proposed land restoration and mitigation measures.

3

Wetlands and Stormwater

From the Secretary's Certificate on the Draft EIR

> _Wetlands and Stormwater_
>
> *It is unclear why wetlands impacts were not quantified in DEIR narrative given the level of design achieved at this point. The FEIR should quantify existing wetland resource areas in the project ROW and estimate project-related impacts to each resource area. The FEIR should describe the extent of tree removal/conversion of forested wetland to shrub/scrub or emergent wetland. The FEIR should summarize the impacts by resource area and by municipality and provide detailed information on mitigation measures for each resource area.*
>
> *The FEIR should quantify the potential amount of permanent BVW impacts and temporary wetland alteration, identify proposed wetland replication areas, and demonstrate compliance with 401 WQC standards at 314 CMR 9.06 that require the project to avoid, minimize, and mitigate the placement of fill in BVW. The Proponent should review the MassDEP Inland Wetlands Replication Guidance document to assist in the design of wetland replication areas, if required. The FEIR should specifically discuss how the locations of replacement or new utility structures were determined to balance maximum wetland avoidance and engineering requirements of utility pole span and conductor clearance. If applicable, the FEIR should include the results of a Wildlife Habitat Evaluation completed pursuant to the WPA regulations (310 CMR 10.60) and the procedures and methods detailed in MassDEP's Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands.*
>
> *The FEIR should identify the project's impacts to wetland resource areas (i.e., associated with use of swamp mats and general construction activities) that will be subject to USACE review. USACE regulations and guidance categorize wetland impacts as either permanent (fill), temporary (disturbance), or secondary. The FEIR should identify applicable USACE performance standards and regulations to assist in determining the potential overlap or conflict with State wetland permitting requirements. The FEIR should include narrative and supporting data or graphics as necessary to demonstrate that the project can meet all applicable performance standards and regulations. If these standards and regulations cannot be met, the FEIR should describe how construction of the project may otherwise proceed (i.e., a variance, etc.). The FEIR should summarize the content and results of coordination meetings with various regulatory agencies and stakeholders undertaken since the filing of the DEIR.*
>
> *The FEIR should discuss how the use of swamp mats will be effectively managed to limit permanent impacts to wetland resource areas. The FEIR should describe how construction sequencing will be conducted to minimize impacts to wetland resource areas. The FEIR should describe potential monitoring and mitigation (i.e.,*

supplemental plantings, regrading, etc.) efforts to ensure that wetlands will not be permanently impacted and to limit the likelihood of repopulation with invasive species.

Any proposed mitigation program should include a discussion of how the Proponent will restore pre-construction grades and natural wetland vegetation. The FEIR should consider provision of vegetative buffers at roadway crossings.

The FEIR should address comments from MassDEP including: additional mitigation; confirmation of a minimum mitigation for all permanent impacts; discussion of mitigation for temporary impacts with secondary effects; clarification of how the construction work and impacts in pull pad sites will differ from the impact on construction work pads and how the deployment of these pads would impact wetland resources; and confirmation that swamp mats will be deployed within the timeframes specified in the March 2015 PGP promulgated by USACE.

In summary, the FEIR should demonstrate that the project will avoid, minimize or mitigate wetland resource area impacts to the maximum extent practicable. The FEIR should clearly outline a comprehensive wetland mitigation program that meets USACE, MassDEP, and local bylaw requirements and performance standards. This mitigation program should include construction period measures, post-construction period monitoring and restoration, and measures to promote wildlife habitat and prevent the establishment of invasive species.

The FEIR should evaluate impacts from stormwater runoff during construction and post-construction. It should demonstrate that source controls, pollution prevention measures, erosion and sedimentation control measures, and any required post-construction drainage system will be designed in compliance with MassDEP Stormwater Management Regulations. The FEIR should consider use of low impact development (LID) measures and integrated management practices (IMP), if applicable to the project.

Introduction

This chapter addresses the Secretary's Certificate with updated information pertaining to unavoidable permanent and temporary wetland resource area impacts necessary for the construction of the Project. Proposed wetland impacts have been avoided wherever possible, minimized to the greatest extent feasible, and mitigated fully where resource impacts are unavoidable. This chapter restates the construction methodology proposed in the DEIR and accepted as appropriate best management practices ("BMPs") for the control of sediment and for water quality protection during construction and corridor restoration activities.

As requested by the Secretary's Certificate, coordination meetings were held with USACE, as follows: an initial pre-application meeting was held on 6/10/15: a final pre-application meeting was held on 8/11/15; and, a site visit was conducted on 8/28/15. MassDEP consultations occurred on 12/10/15 and a Post Filing Application Review Meeting was held on 12/15/15.

Wetlands

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Existing Wetland Resource Areas

VHB environmental scientists delineated wetland resource areas along the ROW corridor in the summer of 2014. VHB performed wetland delineations in accordance with methods described in the US Army Corps of Engineers' *Regional Supplement to the Corps of Engineers' Wetland Delineation Manual: Northcentral and Northeast Region*, the 1987 Corps of Engineers' *Wetland Delineation Manual*, and MassDEP's 1995 manual titled *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act*. The boundary delineations between upland and wetland were marked in the field with sequentially numbered pink flagging. VHB recorded the position of each flag with a Trimble GeoXT Global Positioning System ("GPS") unit capable of post-processed sub-meter accuracy. USACE Wetland Determination Data Forms were prepared for each wetland system on the Project ROW and have been submitted to the USACE.

The wetland resource areas identified along the length of the Project include freshwater wetlands and surface waterbodies and waterways subject to jurisdiction under Sections 401 and 404 of the federal Clean Water Act, the Massachusetts Surface Water Quality Standards (314 C.M.R. 4.00), and the Massachusetts Wetlands Protection Act ("MWPA," 310 C.M.R. 10.00). All freshwater wetlands identified along the Project length meet the criteria of federally regulated wetlands (Waters of the United States) and most are also state-regulated Waters of the Commonwealth. The following sections describe the types of wetland resource areas within the Project limits.

Palustrine Forested Wetland

Narrow bands of palustrine forested wetlands ("PFO") occur along the unmaintained borders of the ROW. These areas typically extend into larger forested wetland systems beyond the ROW boundary.

Dominant plant species within PFO on the Project typically include red maple (*Acer rubrum*), white pine (*Pinus strobus*), American elm (*Ulmus americana*), speckled alder (*Alnus incana*), highbush blueberry (*Vaccinium corymbosum*), glossy buckthorn (*Frangula alnus*), winterberry (*Ilex verticillata*), southern arrowwood (*Viburnum dentatum*), silky dogwood (*Swida amomum*), cinnamon fern (*Osmundastrum cinnamomeum*), sensitive fern (*Onoclea sensibilis*), soft rush (*Juncus effusus*), various sedge species (*Carex* spp.), and sphagnum moss (*Sphagnum* spp.).

Table 3-1 lists each wetland system for which portions may be classified as PFO, along with the associated sheet number from the plan set included in Attachment A.

Table 3-1: PFO Wetlands along Project Corridor

Wetland ID	Plan Sheet No.	Town
WA1	1, 1A, 2, 3	Tewksbury
WA2	4, 5	Tewksbury
WA OR1	20	Dracut

Palustrine Scrub-Shrub Wetland

The majority of the wetland systems within the ROW can be characterized as palustrine scrub-shrub wetlands ("PSS"). These wetlands occur within the maintained portions of the ROW.

Dominant species within PSS on the Project ROW typically include speckled alder, highbush blueberry, glossy buckthorn, maleberry (*Lyonia ligustrina*), silky dogwood, southern arrowwood, multiflora rose (*Rosa multiflora*), meadowsweet (*Spiraea alba*), steeplebush (*Spiraea tomentosa*), sheep laurel (*Kalmia angustifolia*), cinnamon fern, sensitive fern, purple loosestrife (*Lythrum salicaria*), cattail (*Typha* spp.), common reed (*Phragmites australis*), common cinquefoil (*Potentilla simplex*), swamp dewberry (*Rubus hispidus*), greenbrier (*Smilax* spp.), poison ivy (*Toxicodendron radicans*), and numerous species of goldenrods (*Solidago* spp.), sedges (*Carex* spp.), and rushes (*Juncus* spp.).

Table 3-2 lists each wetland system for which portions may be classified as PSS, along with the associated sheet number on the plan set.

Table 3-2: PSS Wetlands along Project Corridor

Wetland ID	Plan Sheet No.	Town
WA1	1, 2	Tewksbury
WA1A	4	Tewksbury
WA1B	4, 5	Tewksbury
WA1C	6	Tewksbury
WA3	7	Tewksbury
WA4	7, 8	Tewksbury
WA5	8	Tewksbury
WA7	8	Tewksbury
WA7A	8	Tewksbury
WA7B	8, 9	Tewksbury
WA8	10, 11	Andover
WA9	11	Andover
WA10	11	Andover
WA11	12	Andover
WA11A	12	Andover
WA13	14, 16	Andover, Dracut
WA14	17	Dracut
WA15	17	Dracut
WA15A	18	Dracut
WA16	19, 21	Dracut
WA17	22, 23	Dracut
WA17A	23	Dracut
WA17B	23	Dracut
WA18	23	Dracut
WA19	23	Dracut
WA18A	23, 24	Dracut
WA18B	24	Dracut
WA20	24	Dracut
WA21	24	Dracut
WA22	24	Dracut
WA23	24, 25	Dracut
WA24	25	Dracut
WA25	25	Dracut
WA26	26, 27	Dracut
WA27	26	Dracut
WA28	26, 27, 28	Dracut
WA29	28, 29	Dracut

Palustrine Emergent Marsh

There are a number of palustrine emergent marshes ("PEM") within the maintained portion of the ROW. In some cases, these systems extend off the ROW as part of a larger wetland system.

Dominant species within PEM along the ROW typically include cattail, purple loosestrife, common reed, sensitive fern, cinnamon fern, sphagnum moss, and various woolgrass (*Scirpus* spp.), goldenrods (*Solidago* spp.), sedges (*Carex* spp.), and rushes (*Juncus* spp.).

Table 3-3 lists each wetland system for which portions may be classified as PEM, along with the associated sheet number on the plan set.

Table 3-3: PEM Wetlands along Project Corridor

Wetland ID	Plan Sheet No.	Town
WA1	1, 1A, 2, 3	Tewksbury
WA1A	3, 4, 5, 6	Tewksbury
WA3	7	Tewksbury
WA4	7, 8	Tewksbury
WA6	8	Tewksbury
WA7	8	Tewksbury
WA7B	8, 9	Tewksbury
WA7C	8	Tewksbury
WA10	11	Andover
WA 13	14, 16	Dracut
WA 16	19, 21	Dracut
WA 17	22, 23	Dracut
WA 29	28, 29	Dracut

Riverine Systems

A number of riverine systems flow along and through the ROW. These systems range from intermittent to perennial in nature and many have wetlands associated with their boundaries.

Table 3-4 lists each wetland system for which portions may be classified as Riverine Systems, along with the associated sheet number on the plan set.

Table 3-4: Riverine Systems along Project

Wetland ID	Stream ID	Plan Sheet	Town	Water Body Name (if any)
WA1A	SA1	6	Tewksbury	—
WA1C	SA3	6	Tewksbury	—
WA7	SA2, SA3	8	Tewksbury	—
WA7A	SA2	8	Tewksbury	—
WA7B	SA3	8, 9	Tewksbury	—
WA10	SA3A	11	Andover	—
WA12	SA4	13	Andover, Dracut	Merrimack River
WA13	SA5, SA6	14,16	Dracut	Unnamed stream and Mine Brook
WA15A	SA7	18	Dracut	—
WA17	SA8	22, 23	Dracut	Trout Brook
WA17A	SA9	23	Dracut	—
WA17B	SA9	23	Dracut	—

■

Wetland Resource Area Impacts

The Project will result in permanent unavoidable impacts to a small area of bordering vegetated wetland for the placement of utility poles and for the creation of a permanent access point in Dracut. Swamp mats will be used to minimize disturbance to wetlands during construction but will result in temporary impacts to these resources. Mats may be used for access, work pads, or pull sites within wetland resource areas. Work pads will be used at each structure location to facilitate the installation of foundations and structures, while pull pads will be used for the installation of the conductor and shield wire. In all cases, use of swamp mats in these locations will follow standard BMPs as described below in the "Proposed Mitigation" section to minimize disturbance to wetland soil and vegetation.

The Project will also require tree clearing along previously unused portions of the existing ROW limits to allow for safe construction and operation of the new transmission line, resulting in conversion from forested wetland to scrub-shrub or emergent wetland types (referred to as "secondary" impacts under the USACE mitigation guidelines). The USACE also reviews tree clearing in uplands within 100 feet of streams. The permanent, temporary, and secondary impacts associated with the Project are summarized in Table 3-5, and a breakdown of the impacts by town, resource area, and square footage is provided in Table 3-6.

Table 3-5: Summary of Project Impacts

Impact Type	Area of Disturbance
Permanent (Utility Structures and Permanent Access)	
In Wetlands	2,013 sf (0.046 ac)
In Riverfront Area	170 sf (0.004 ac)
In 100-Year Floodplain	164 sf (0.004 ac)
Temporary (Swamp Matting)	
In Wetlands	575,044 sf (13.2 ac)
In Riverfront Area	67,922 sf (1.56 ac)
In 100-Year Floodplain	66,553 sf (1.53 ac)
Secondary (Tree Clearing)	
In Wetlands[1]	100,287 sf (2.3 ac)
In Riverfront Area	5,637 sf (0.13 ac)
In 100-Year Floodplain	64,710 sf (1.49 ac)

1- Includes timber matting that are included

Vernal Pools

Under the Massachusetts General Permit issued by the USACE for activities subject to Section 404 of the Clean Water Act, vernal pools include known pools identified as Certified or Potential Vernal Pools ("CVPs" or "PVPs") by the Natural Heritage and Endangered Species Program ("NHESP"). They may also include any depression that meets the certification criteria in NHESP's "Guidelines for the Certification of Vernal Pool Habitat" at http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/vernal-pools/.

The General Permit identifies three Vernal Pool Management Areas:

- Vernal Pool Depression: includes the VP depression up to the spring or fall high water mark, and includes any vegetation growing within the depression
- Vernal Pool Envelope: the area within 100 feet of the VP Depression's edge
- Vernal Pool Critical Terrestrial Habitat: the area within 100–750 feet of the VP Depression's edge

A comprehensive vernal pool survey was conducted in the spring of 2015 by VHB personnel. Two CVPs were confirmed in Dracut during this effort: one in Wetland 14, located within a large depression near a quarry operation north of Methuen Street (Sheet 17), and one in Wetland 21 just north of Broadway Road/Route 113 (Sheet 24). An additional certifiable pool was identified within Wetland 11A (Sheet 12) south of River Road in Andover.

The pool within Wetland 11A is located entirely within the maintained ROW. Its envelope is made up almost entirely of maintained ROW with a small portion of forested uplands and a residential lot, while its Critical Terrestrial Habitat contains primarily maintained ROW along with portions of River Road, forested upland, and

Table 3-6: Wetland Impacts by Location

Wildlife Habitat Impact Area	Wetland Area #	MA Wetland Resource Area (s)	Town	Associated Stream (SA#)	BVW (sf)				RFA (sf)				100 Year Floodplain (BLSF)(sf)			
					Permanent (fill) sf	Temporary (timber mat access, timber mat work areas, timber mat pull/stringing areas, and staging areas) sf	Tree Clearing		Permanent (fill) sf	Temporary (timber mat access, timber mat work areas, timber mat pull/stringing areas, and staging areas in wetland and/orupland work areas) sf	Tree Clearing		Permanent (fill) sf	Temporary (timber mat access, timber mat work areas, timber mat pull/stringing areas, and staging areas in wetland and /or upland work areas) sf	Tree Clearing	
							Timber mats placed within tree clearing Zone (sf)	Tree Clearing only (secondary impacts) sf			Timber mats placed within tree clearing Zone (sf)	Tree Clearing (secondary impacts) sf			Timber mats placed within tree clearing Zone (s)	Tree Clearing (secondary impacts) sf
1	WA29	BVW	Dracut	NA	-	2,424	-	-	-	-	-	-	-	-	-	-
2	WA29	BVW	Dracut	NA	600	-	-	-	-	-	-	-	-	-	-	-
3	WA28	BVW	Dracut	NA	-	1,291	-	-	-	-	-	-	-	-	-	-
4	WA28	BVW	Dracut	NA	-	478	-	-	-	-	-	-	-	-	-	-
5	WA26	BVW	Dracut	NA	-	374	-	-	-	-	-	-	-	-	-	-
6	WA26	BVW	Dracut	NA	-	1,242	-	-	-	-	-	-	-	-	-	-
7	WA24	BVW	Dracut	NA	-	499	-	-	-	-	-	-	-	-	-	-
8	WA23	BVW	Dracut	NA	-	1,103	-	-	-	-	-	-	-	-	-	-
9	WA23	BVW	Dracut	NA	-	4,098	4,098	10,276	-	-	-	-	-	-	-	-
10	WA23	BVW	Dracut	NA	15	22,960	-	-	-	-	-	-	-	-	-	-
11	WA20	BVW	Dracut	NA	-	2,211	-	-	-	-	-	-	-	-	-	-
12	WA18A and WA18B	BVW	Dracut	NA	-	-	-	-	-	-	-	-	-	-	-	-
13	WA19	BVW	Dracut	NA	-	620	-	-	-	-	-	-	-	-	-	-
14	WA1B	BWV	Dracut	NA	-	991	-	-	-	-	-	-	-	-	-	-
15	WA17A	BVW	Dracut	NA	-	5,049	-	-	-	-	-	-	-	-	-	-
16	WA17A	BVW	Dracut	NA	-	1,765	-	-	-	-	-	-	-	-	-	-
17	WA17A	BVW	Dracut	SA-9	-	-	-	1,716	-	-	-	-	-	-	-	-
18	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	-		137	2,189	-	-	-	-
19	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	25	6,847	-	-	-	-	-	-
20	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	15	4,809	-	-	-	-	-	-
21	WA17	BVW and RFA	Dracut	SA-8	-	2,900	-	-	-	2,900	-	-	-	-	-	-
22	WA17	BVW, RFA	Dracut	SA-8	-	587	-	-	-	696	-	-	-	-	-	-
23	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	-	2,496	-	-	-	-	-	-
24	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	50	27,671	-	-	-	-	-	-
25	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	-	-	-	3,448	-	-	-	-
26	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	-	1,127	-	-	-	-	-	-
27	Trout Brook RFA	RFA	Dracut	SA-8	-	-	-	-	25	7,153	-	-	-	-	-	-
28	WA17	BVW	Dracut	NA	150	15,397	-	-	-	-	-	-	-	-	-	-
29	WA16	BVW	Dracut	NA	-	461	-	-	-	-	-	-	-	-	-	-
30	WA16	BVW	Dracut	NA	30	9,840	-	-	-	-	-	-	-	-	-	-
31	WA16	BVW	Dracut	NA	-	2,670	-	-	-	-	-	-	-	-	-	-
32	WA15A	BLSF, RFA	Dracut	SA-7	-	-	-	-	-	570	-	-	-	365	-	-
33	Unnamed Perennial Stream RFA	RFA	Dracut	NA	-	-	-	-	55	13,653	-	-	-	-	-	-
34	WA13	BVW	Dracut	SA-5	55	34,248	-	-	-	-	-	-	-	-	-	-
35	WA8	BVW	Andover	NA	-	305	-	-	-	-	-	-	-	-	-	-
36	WA7B	BVW	Tewksbury	NA	30	14,916	-	-	-	-	-	-	-	-	-	-
37	WA7B	BVW	Tewksbury	SA-3	85	57,935	-	-	-	-	-	-	-	-	-	-
38	WA7B	BVW	Tewksbury	SA-3	59	33,280	-	-	-	-	-	-	-	-	-	-
39	WA7C	BVW	Tewksbury	NA	100	4,915	-	-	-	-	-	-	-	-	-	-
40	WA7	BVW	Tewksbury	SA-3	-	6,794	-	-	-	-	-	-	-	-	-	-
41	WA7	BVW	Tewksbury	SA-2 & SA-3	109	22,116	-	-	-	-	-	-	-	-	-	-
42	WA7	BVW	Tewksbury	SA-2	9	10,075	10,074	8,803	-	-	-	-	-	-	-	-
43	WA7	BVW	Tewksbury	NA	50	25,316	-	-	-	-	-	-	-	-	-	-
44	WA4	BVW	Tewksbury	NA	120	58,503	-		-	-	-	-	-	-	-	-
45	WA1C	BVW	Tewksbury	SA-1	-	1,254	-	-	-	-	-	-	-	-	-	-
46	WA1A	BVW	Tewksbury	SA-1	50	26,703	-	-	-	-	-	-	-	-	-	-
47	WA1A	BVW	Tewksbury	NA	-	1,934	-	-	-	-	-	-	-	-	-	-
48	WA1A	BVW	Tewksbury	NA	-	1,461	1,461	561	-	-	-	-	-	-	-	-
49	WA1A	BVW	Tewksbury	NA	-	1,316	-	-	-	-	-	-	-	-	-	-
50	WA1A	BVW	Tewksbury	NA	-	3,716	-	-	-	-	-	-	-	-	-	-
51	WA1A	BVW	Tewksbury	NA	-	687	687	-	-	-	-	-	-	-	-	-
52	WA1A	BVW	Tewksbury	NA	-	3,804	-	-	-	-	-	-	-	-	-	-
53	Flood Zone Assoc with WA1	BLSF	Tewksbury	NA	-	-	-	-	-	-	-	-	-	-	139	1,962
54	WA1	BVW, BLSF	Tewksbury	NA	55	25,442	-	-	-	-	-	-	30	7,328	-	-
54a	WA1	BVW, BLSF	Tewksbury	NA	-	4,364	-	-	-	-	-	-	-	4,364	-	-
55	WA1	BVW, BLSF	Tewksbury	NA	18	29,028	29,028	33,582	-	-	-	-	18		29,218	33,392
56	WA1	BVW, BLSF	Tewksbury	NA	259	93,819	-	-	-	-	-	-	59	31,343	-	-
57	WA1	BVW, BLSF	Tewksbury	NA	9	29,940	-	-	-	-	-	-	57	23,153	-	-
58	WA1	BVW	Tewksbury	NA	-	6,212	-	-	-	-	-	-	-	-	-	-
Totals SF	-	-	-	-	1,803	575,044	45,349	54,937	170	67,922	137	5,637	164	66,553	29,357	35,353
Totals Acres	-	-	-	-	0.04	13.20	1.04	1.26	0.004	1.56	0.003	0.13	0.004	1.53	0.67	0.81
Total Tree Clearing (sf)	-	-	-	-	-	-	100,287		-	-	5774		-	-	64,710	
Total Tree Clearing (ac)	-	-	-	-	-	-	2.30		-	-	0.13		-	-	1.49	

residential homes. The pool within Wetland 14 straddles the eastern ROW boundary, with approximately half of the pool within the maintained ROW. Its envelope includes forested uplands and maintained ROW, while its Critical Terrestrial Habitat contains forested uplands, wetland areas, maintained ROW, and portions of Brox Quarry. The pool within Wetland 21 is located within the standing water adjacent to the ROW access along the eastern boundary of the ROW. Standing water extends off-ROW into a forested wetland; however, the only portion of the pool being utilized during the investigation was the maintained portion of the pool. The pool's envelope encompasses forested wetlands and uplands, Route 113, and maintained ROW, including the ROW access that defines the pool's western boundary. The Critical Terrestrial Habitat of the pool is composed of forested uplands, maintained ROW, wetlands, Route 113, and residential and industrial land uses.

The complete results of the vernal pool survey, which was completed using the USACE Draft New England District Vernal Pool Assessment[1] guidance, was submitted to USACE and MassDEP in the 401/404 Joint Application.

Flood Zones

Flood data for the Project area was compiled using existing Flood Insurance Rate Maps published by the Federal Emergency Management Agency ("FEMA"). The MVRP project area crosses three areas mapped as 100-year flood zones. These are associated with the Great Swamp in Tewksbury (Sheets 1–5), the Merrimack River in Andover and Dracut (Sheet 13), and an unnamed stream system in Dracut (Sheet 18). Flood zones are depicted on the plans in Attachment A.

Wildlife Habitat Evaluation

The Wildlife Habitat Evaluation is included in Attachment D.

Regulatory Compliance

As detailed in Chapter 1, the Proponent will design, build, and maintain the facilities for the Project in accordance with all federal, state, and local regulations, including Sections 401 and 404 of the Clean Water Act, the MWPA, and the local wetland protection bylaws of Tewksbury, Andover, and Dracut.

As requested by the Secretary's

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[1] US Army Corps of Engineers – New England District Vernal Pool Assessment. 9/10/2013. http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/NEGP/VPAssessmentDRAFT.pdf

Proposed Mitigation

For unavoidable wetland impacts, the Company proposes to provide compensatory mitigation in the form of wetland replication for permanent impacts, in-situ restoration for temporary impacts, and use of the in-lieu fee for secondary impacts for conversion of forested wetland to scrub-shrub wetland complexes. These are described in more detail below. In addition, reference is made throughout the following mitigation section to the Company's Environmental Guidance Document 303-NE - Natural Resources Protection is included in Attachment F.

Avoidance and Minimization of Wetland Impacts

The planning and design portion of Project development incorporated several measures to avoid direct wetland impacts. Structure locations and their associated work areas and pull-sites were relocated and/or resized to avoid encroaching upon wetlands when practicable. When practicable, routing of access roads to and within the Project ROW was designed to avoid wetlands. Existing access roads on the ROW were employed where practicable to avoid unnecessary wetland impacts.

Structure Spotting and Work Pad Planning

NEP evaluated practicable alternatives for avoiding the location of structures in wetlands. As part of this process, locations of utility structures were selected and modified until a balance between maximum wetland avoidance and engineering requirements of utility pole span lengths and conductor clearances could be achieved. Following the initial layout of structures, the team coordinated to relocate three structures and eliminate one structure to avoid wetland impacts. As an example, one of the relocated structures eliminated the need to mat within the beaver impoundment located in Wetland 17.

The team was also able to make a number of design modifications, including shifting work pads in nine locations, to avoid and minimize wetland impacts. The specific wetland areas where these modifications were made are shown on the plans include in Attachment A include:

- Wetland Area-1B at Structure 8 on Page 4 of 29
- Wetland Area-7B at Structure 18 on Page 9 of 29
- Wetland Area-13 at Structure 30 on Page 14 of 29
- Wetland Area-14 at Structures 34 and 153 on Page 17 of 29
- Wetland Area-15A at Structures 35 and 152 on Page 18 of 29
- Wetland Area-16 at Structures 40 and 147 on Page 21 of 29
- Wetland Area-17 at Structure 145 on Page 22 of 29
- Wetland Area-17 at Structure 45 on Page 22 of 29
- Wetland Area-19 at Structure 47 on Page 23 of 29

Access Routes

NEP evaluated access roads and routes throughout the length of the ROW to optimize access to work areas while avoiding and minimizing wetland encroachment. Concurrent with this activity, work pads were located and configured to avoid and minimize the temporary placement of timber mats in wetland resource areas. Avoidance and minimization measures included:

- Eliminating wetland crossings by identifying locations where access to a work area would only be achieved from one location by employing "turn around points";
- Using known off-ROW access points to avoid crossings; and
- Where crossings could not be avoided, wetlands will be crossed at the narrowest point within the ROW corridor and/or along existing historic hard-bottomed surfaces.

■

Construction Phasing and Impact Minimization

Construction phasing will be carefully planned and executed. The timing and coordination of construction activities will be developed to minimize the number and duration of outages, maximize efficiencies in the construction process, maintain a safe work environment for personnel and contractors, and comply with environmental regulatory requirements. Work within Massachusetts is likely to progress with two construction forces—one proceeding north from Dracut Junction into New Hampshire, and the second proceeding from Tewksbury north to Dracut Junction. In general, construction will proceed on a circuit-by-circuit basis; this will be more efficient than construction, relocation, and removal all being completed within a given segment before moving on to the next. This will limit the amount of wetland disturbance occurring within a given section of the ROW at any given time, as it will be contained to only the area required for work on the circuit being constructed.

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Meeting Design Standards and Regulatory Requirements

The minimum required separation between conductors of transmission circuits, both conductors of the same circuit and conductors of different circuits, is set forth in 220 C.M.R. 125.23 and Section 23 of the 2012 National Electrical Safety Code ("2012 NESC"). These minimum requirements form the basis of design for the spacing of conductors, the supporting structures for a particular circuit, and between supporting structures of different circuits. Generally, conductors must be separated by more than the minimum required by code in order to reduce the probability of storm-related contacts between the conductors and to enable future maintenance.

NERC is required by Section 215 of the Federal Power Act to develop mandatory and enforceable reliability standards. This includes Transmission Vegetation Management Standards, which are outlined in NERC's FAC-003-3 Electric Reliability Standard. This document establishes Minimum Vegetation Clearance Distances with which utilities must comply at all times to prevent "flash-over," in which an arc of electricity jumps to the nearby vegetation, potentially causing a loss of transmission to customers or a fire in the tree. Prudent vegetation management practices dictate that trimming should occur beyond the minimum clearance to account for the fact that vegetation will continuously grow and sway in the wind, and to account for power line sagging due to high usage, heat, or snow/ice buildup.

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Compensation Requirements

Compensation for unavoidable wetland impacts will be provided in several forms to comply with the various wetland permit programs that have jurisdiction over work planned as part of the Project. Permit programs that have jurisdiction over the planned Project include Section 404 of the federal Clean Water Act, MassDEP Water Quality Certification / Section 401 of the federal Clean Water Act, the Massachusetts Wetlands Protection Act, and local Conservation Commission Bylaws (Tewksbury and Dracut).

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Permanent Impacts: Wetland Replication

The Massachusetts Water Quality Certification and Massachusetts Wetlands Protection Act regulations both require at least 1:1 replacement for losses of bordering or isolated wetlands. The Town of Tewksbury does not specifically address mitigation requirements in their bylaw or regulations, but they do implement a policy that requires mitigation at a 2:1 ratio for wetland loss. The Town of Dracut's wetland bylaw does not specify a mitigation ratio for wetland loss but states that the Commission may require replication. Based on these local requirements and the current New England District Compensatory Mitigation Guidance (2010) and previous consultation with the USACE, replication will be provided at a minimum of 2:1 ratio for permanent impacts in Tewksbury and Dracut.

In Tewksbury, the proposed replication is located north of Andover Street/Route 133, on the south side of Wetland 7A and west of the existing access road (Page 8 of 29) of the plan set in Attachment A. The replication area will encompass approximately 2,070 square feet to mitigate approximately 953 square feet of permanent fill, which represents a greater than 2:1 replication to fill ratio.

In Dracut, the proposed replication area is located north of Methuen Road, on the north side of Wetland 29 and east of the existing access road and proposed permanent crossing (Page 28 of 29) of the plan set in Attachment A. The replication area will encompass approximately 1,700 square feet to mitigate approximately 850 square feet of permanent fill, which represents a 2:1 replication to fill ratio.

Preliminary wetland replication plans were submitted to MassDEP and USACE in support of the Section 401/404 joint permit application that was filed on November 6, 2015. Updated plans are provided in Attachment C.

Following any necessary revisions, detailed wetland replication plans will be included in the Notices of Intent to be filed with the Tewksbury and Dracut Conservation Commissions and with MassDEP. These filings are anticipated to take place in January 2016 with public hearings slated for February 2016.

■

Temporary Impacts: In-Situ Restoration

As previously described in the DEIR and subsequently confirmed through discussions with USACE, areas of temporary wetland impacts from the placement of swamp mats will be restored in-situ. Due to its use as an existing transmission line right-of-way, the proposed area of work has been previously disturbed and NEP has successfully worked in these areas and restored them without any adverse effect. Wherever possible, mats will be placed in the same areas that were used for previous work. Restoration measures will include cleaning of swamp mats, post-mat-removal inspections, restoration of the soil surface, seeding and mulching, removal of erosion controls, invasive species control, and post-restoration inspections. These measures are described in more detail in the sections that follow.

Swamp Matting Best Management Practices

To facilitate access and work within wetland resource areas during construction, it will be necessary to temporarily place swamp mats for access to and work at new structure locations, equipment staging, and conductor stringing areas. Swamp mats consist of heavy timbers, planking, and/or other manmade materials joined to form stable platforms that are placed over the surface of wetlands. Depending on time of year and field conditions, mats may not be required to satisfy performance standards of minimal impact to wetland resources. Following construction, mats will be removed and the natural wetland vegetation (with the exception of trees) will be allowed to repopulate the temporarily disturbed construction area.

The use of swamp mats allows for movement and work within wetland areas without the need to remove all vegetation beneath the access way. They also help to reduce the degree of rutting in soft wetland soils. In some instances, their use does result in temporary disturbance to soils. Following removal of swamp mats, if the soil surface is excessively disturbed it will be restored in compliance with NEP's standard best management practices. The locations where swamps mats will be used within wetland resource areas on the Project site are shown on the Project plans included in Attachment A.

Construction access will primarily be accomplished immediately adjacent to the existing maintained transmission line corridor. Where this access passes through wetland, swamp mats will be employed to minimize disturbance to the wetland surface and to provide safe and stable conditions for heavy construction equipment passage by distributing heavy loads over a broad surface area. In general, swamp mats are typically used when access is required within wetlands with soft soils and on occasion within non-wetland areas when it is necessary to provide a firm base for construction activities. Placement of fill and/or grading will not occur within wetland resource areas. Following completion of work within wetland areas, the swamp mats will be removed and the area regraded as necessary to restore preconstruction conditions. After regrading, disturbed soils will be reseeded as necessary with a wetland seed mix or will be allowed to re-vegetate naturally.

NEP confirms that swamp mats will be deployed within the timeframes specified in the March 2015 PGP promulgated by USACE and as otherwise required by the USACE 404 Permit.

Cleaning of Swamp Mats

Swamp mats shall be certified clean by the vendor prior to installation. The vendor shall use the certification form provided as Appendix 5 within EG-303NE to document compliance. Clean is defined as being free of plant matter (stems, flowers, roots, etc.), soil, or other deleterious materials prior to being brought to the Project site. Any equipment or swamp mats that have been placed or used within areas containing invasive species within the Project site shall be cleaned of plant matter, soil, or other deleterious materials at the site of the invasive species prior to being moved to other areas on the Project site to prevent the spread of invasive species from one area to another. Swamp mats shall be cleaned prior to being removed at the completion of the Project; exceptions to this requirement may be made on a case-by-case basis. The vendor shall consult with the NEP Environmental Scientist prior to discharging or disposing of any wastewater or material from the cleaning of swamp mats.

Swamp Mat Removal

Once swamp mats are removed, wetlands shall be inspected for buildup of sand or other materials that may have fallen through the swamp mat access road/work pad. Care shall be taken to inspect wetland crossings carefully as each mat is removed to ensure any such materials are properly removed and disposed of off-site. The environmental monitor shall conduct the inspection within five business days of swamp mat removal. Inspections shall be documented using the form provided as Appendix 4 within EG-303NE and a copy will be submitted (at a minimum) to the NEP environmental scientist, project manager, and the construction supervisor.

Restoration of Soil Surface

If rutting or soil compaction following swamp mat removal is observed by the environmental monitor, it shall be reported to the NEP environmental scientist, project manager, and the construction supervisor.
The area shall be returned to pre-existing conditions consistent with the surrounding area, by light hand raking or by back-blading with machinery, and shall be overseen by the environmental monitor. Deep ruts (less than 12 inches) shall be graded using available, loose soil from the work area.

Seeding and Mulching

Where root and seed stock are absent within graded sites, these areas shall be promptly stabilized by applying a NEP–approved seed mix and mulching with straw to reduce erosion and visual impact as soon as possible following completion of work at the site. Refer to EG-303NE BMP #9. Wetland areas where adequate root and seed stock are absent will be seeded using a NEP–approved wetland native seed mix. Refer to EG-303NE BMP #10 (page 2 of 2).

Restoration Completion

Within 30 calendar days of removal of swamp mats from individual crossings, the mitigation measures outlined above shall be completed.

Removal of Erosion Controls

Strings and stakes shall be removed from straw bales. Straw bales shall be broken up and lightly scattered as mulch. Siltation fencing, strings, and stakes shall be removed and disposed of as ordinary waste.

Post-Restoration Inspections

The environmental monitor shall inspect restored areas following restoration to ensure no noticeable adverse effects to the plant community, soil characteristics, and micro-topography. In addition, inspections shall monitor for the presence of nonindigenous invasive species where the wetlands were not dominated by such invasive(s) prior to construction. All inspections shall be documented using the form provided as Appendix 4 within EG-303NE and a copy will be submitted (at a minimum) to the NEP environmental scientist, project manager, and the construction supervisor.

Invasive Species Control

During construction, all swamp mats shall be certified clean of plant material prior to installation. Immediately upon removal of swamp matting and again following final restoration, the footprint of all work areas within wetland resource areas will be inspected for the presence of non-indigenous invasive vegetation not previously observed within each wetland. During the 60-day post-restoration inspection period, should any such invasive vegetation be encountered during inspections, the following controls will be implemented by the environmental monitor, NEP, and/or their contractors:

- Young plants that may have become established during Project construction will be pulled by hand or dug up if the plant is not too big and the infestation is limited in areal coverage. Hand pulling or digging may be effective on small, very young plants or for a single specimen, but is not effective or practical once a stand becomes established. Crews will only remove vegetation by hand if the entire plant, including the root mass, can be easily removed with limited alteration to wetland soils.
- Depending on the species, the extent of colonization, location, the presence of other non-invasive plants, the sensitivity of an area, and other factors, glyphosate or other appropriate herbicide applications may be sprayed or applied by a wicking device. Any herbicide application will be conducted by a Massachusetts licensed herbicide applicator in accordance with the applicable regulations.

■

Secondary Impacts: In-Lieu Fee

Based on discussions with the USACE, secondary impacts associated with tree removal in wetlands and in-stream buffers is 100,287 square feet, which under the USACE New England District Compensatory Mitigation Guidance (2010) must be mitigated at 15% of the standard ratio for permanent fill (i.e. 15,045 square feet). The USACE has established an in-lieu fee ("ILF") program for mitigation projects in Massachusetts. The Massachusetts Department of Fish and Game is the sponsor and administrator of the ILF program and uses the fees paid by project applicants to fund mitigation projects in the Commonwealth.

Under the USACE's regulations at 33 CFR § 332.3, payment of an ILF is preferred to other mitigation options, such as preservation. The presumption is rebuttable and NEP initially considered preservation of company-owned parcels as a possible mitigation method for the Project's secondary impacts. Based on early discussions with the USACE, NEP would need to provide compensatory mitigation for 15% of the Project's total secondary impacts at a 15:1 ratio, which would require a parcel of approximately 5.5 acres.

NEP initially identified 10 parcels in Andover, 14 parcels in Dracut, and 9 parcels in Tewksbury that could potentially serve as preservation sites. These 39 sites were screened at a high level in GIS for their size, balance of wetlands and uplands, and other natural resource features such as vernal pools, floodplain, rare species habitat, and/or location within Areas of Critical Environmental Concern or Outstanding Resource Waters.

Based on this screening, the list of parcels was pared down to 4 sites with the best characteristics, including 2 sites in Tewksbury, 1 site in Dracut, and 1 site in Andover. These parcels were then evaluated for their ability to provide protection of important aquatic resources, proximity to existing preserved lands, and for the level of threat of development associated with each parcel. They were also reviewed in the field and in detail by NEP's transmission, distribution, and substation groups for potential conflicts with current and future uses. Upon further review, it was found that these parcels either had existing uses that restricted the amount of property available for mitigation such that they could no longer meet the size or road frontage needed, or they had important potential for future use by NEP such that ownership needed to be retained.

Accordingly, NEP and the USACE agreed that payment to the ILF program was the most appropriate form of mitigation. Using the coastal service area ILF rate per square foot of $14.26 and a total of 15,045 square feet, the in-lieu fee payment for the Project will be $214,550.

Stormwater

No new stormwater or long-term stormwater management facilities are proposed for the Project.

■

Stormwater Regulation and Permitting

The following stormwater-related regulations and guidelines apply to the Project:

- Massachusetts State Stormwater Management Performance Standards and Guidelines Department of Environmental Protection and Office of Coastal Zone Management (MassDEP/CZM, March 1997).
- Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Stormwater Permit for Construction Activities disturbing greater than one acre (EPA, Federal Register, December 8, 1999 and amendments).

Compliance with Checklist for Stormwater Report

Under the definition provided in the MWPA Regulations at 310 CMR 10.04, the Project is considered a mix of new and redevelopment; however, no new stormwater management facilities are required. The construction of the Project will fully implement the ISO 14001 guidelines for Environmental Management System (EMS) for its construction activities. An EMS satisfying the requirements of ISO 14001 is a management tool enabling an organization to identify and control the environmental impact of its activities and to improve its environmental performance continually, and to implement a systematic approach to setting environmental objectives and targets. These procedures and policies have been implemented to ensure that transmission lines are built in accordance with industry standards and in conformity with all applicable environmental regulatory requirements. Compliance with MassDEP's 10 stormwater management standards cited in Section 310 CMR 10.05(6)(k) of the MWPA Regulations is evaluated below:

Standard 1: Untreated discharges

No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

No new point source discharges of stormwater runoff will be created by the Project. Stormwater runoff will be maintained through the use of erosion controls.

Standard 2: Peak rate control and flood prevention

Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

This standard does not apply. No aspect of the Project will require a designed/permanent stormwater management system. Stormwater runoff during construction activities will be maintained through the prudent use of erosion controls.

Standard 3: Recharge to ground water

Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures, including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

A new stormwater system is not proposed because the Project results in no new significant, contiguous impervious surface creation and therefore there will be no significant impact to groundwater recharge. The pre-construction infiltration rate is anticipated to be similar to the post-construction infiltration rate.

Standard 4: 80% TSS removal

Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter are implemented and maintained;
b. Stormwater BMPs are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

This standard does not apply. The Project will not result in an increase of impervious surface, and will not generate suspended solids or other typical contaminants. The construction of the Project will not include introduction of pollutants, fertilizers, or pesticides.

Standard 5: Higher Potential Pollutant Loads (HPPL)

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook *to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to* *rain, snow, snow melt and stormwater runoff, the proponent shall use the specific stormwater BMPs determined by the Department to be suitable for such use as provided in the* Massachusetts Stormwater Handbook. *Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and the regulations promulgated there under at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

This standard does not apply. The MassDEP Policy does not list the proposed construction of utility transmission lines as a land use with higher potential pollutant loads.

Standard 6: Critical areas

Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of the public water supply.

This standard does not apply. No new stormwater discharges are proposed for the Project.

Standard 7: Redevelopments and other projects subject to the standards only to the maximum extent practicable

Redevelopment of previously developed sites must meet Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

This Project qualifies as a Limited Project and a "mix of new and redevelopment." It complies with Standard 1 and addresses the remaining Standards to the extent possible.

Standard 8: Erosion and sediment control

A plan to control construction-related impacts, including erosion sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan), must be developed and implemented.

The Project will require the temporary disturbance of soils. Siltation and erosion control devices will be installed in locations shown in Attachment A. The devices will function to mitigate construction-related erosion and sedimentation, and will also serve as a physical boundary delineating the limits of work in sensitive areas such as wetlands. Proposed erosion control barriers for the Project will typically consist of a silt fence/straw bale barrier, and/or wood chip mulch bags. Erosion controls will be sited pending field conditions, weather conditions, and permit conditions. Additionally, any work that may result in the temporary impact to wetland resources will utilize swamp mats to minimize the occurrence of erosion and sedimentation. A Storm Water Pollution Prevention Plan (SWPPP) will be developed for the Project in order to comply with the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Construction Activities (also known as the Construction General Permit).

Standard 9: Operation and maintenance

A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.

This standard does not apply. A long-term operation and maintenance plan will not be required for the temporary erosion control following the completion of the Project and site stabilization.

Standard 10: Illicit discharges

All illicit discharges to the stormwater management system are prohibited.

This standard does not apply. No new stormwater management system is proposed as a part of this Project.

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Chapter 91

From the Secretary's Certificate on the Draft EIR

> *Chapter 91*
>
> *Comments from the MassDEP Waterways Regulation Program (WRP) indicate that it has determined that the proposed project is an infrastructure crossing facility pursuant to 310 CMR 9.02. 310 CMR 9.12(2)(d) states:*
>
> *"In the case of an infrastructure crossing facility, or any ancillary facility thereto, for which an EIR is submitted, the Department shall find such facility to be water-dependent only if the Secretary has determined that such facility cannot reasonably be located or operated away from tidal or inland waters, based on a comprehensive analysis of alternatives and other information analyzing measures that can be taken to avoid or minimize adverse impacts on the environment, in accordance with M.G.L. c. 30, §§ 61 through 62H."*
>
> *WRP indicates that it considers the project to be water-dependent but will make its formal determination in accordance with 310 CMR 9.12(2)(d). Based on review of the alternatives analysis presented in the DEIR, I find that the facility cannot reasonably be located or operated away from the Merrimack River. Therefore, I concur that this project is water- dependent. The Proponent should consult with the WRP prior to filing a Waterways License application to determine the extent of work within c. 91 jurisdiction. The FEIR should provide an update on the project's compliance in accordance with the c.91 regulations and consultation with WRP.*

Introduction

The Notice of Minor Project Modification was submitted to MassDEP on November 6, 2015. On January 7, 2016 DEP issued a letter indicating that the Project activity constitutes a minor project modification, and that the proposed activity does not require a license. The DEP letter is included at the end of this Chapter.

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MassDEP
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Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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Charles D. Baker
Governor

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Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

January 7, 2016
National Grid
40 Sylvan Road
Waltham, MA 02451
Attn: Mark R. Rielly

RE: Minor Project Modification of Chapter 91 License Nos. 1145 and 2757
Merrimack River, Dracut and Andover, Middlesex and Essex Counties

Dear Mr. Rielly,

The Department has received your Request for a Minor Project Modification, pursuant to 310 CMR 9.22(3), dated November 6, 2015 on behalf of National Grid, who proposes to construct a new 345kV electric transmission line ("3124 Line"), within the existing electrical utility Right-of-Way, which spans the Merrimack River between Dracut and Andover. The proposal would also require shifting two existing lines, N214 and 397 Line, northeasterly by 33.5' and 75' respectively. The existing transmission cables currently used for the 397 Line will remain in place and be renamed 3124 Line. The proposed modification is shown on plans included with your submission.

Said submission includes:

- Cover letter,
- Copy of license nos. 1145 and 2757 and respective license plans,
- Plan titled *"Plan Accompanying Petition of New England Power Company to Modify and Maintain a Power Transmission Line Over and Across the Merrimack River in Dracut and Andover, Massachusetts (4 sheets) dated September 03, 2015"*., and
- Notice of Minor Project modification Form.

The proposed modification results in the construction of one new line and the relocation of two existing lines, all within the existing Right-of-Way. The Tower Structures are located outside of Chapter 91 jurisdiction. There will be no reduction in navigational clearance with respect to what currently exists at the project site. The Department finds the request to be an insignificant deviation from the original specifications of the license. Therefore, the Department has determined that, pursuant to 310 CMR 9.22(3), the activity constitutes a minor project modification, and that the proposed activity does not require a license. The Department will place this letter and the referenced submissions into the license file that originally authorized said work (Waterways License Nos. 1125 and 2757) on the project site.

Please note that other local; state and federal requirements may apply. Should you have any questions pertaining to this matter please do not hesitate to contact Jerome Grafe at (617) 292-5708. Thank you.

Sincerely,

Ben Lynch
Program Chief
Waterways Regulation Program

Cc: file copy

5

Rare Species

From the Secretary's Certificate on the Draft EIR

Rare Species

The FEIR should include the turtle protection plan or explain how the plan will be sufficient to satisfy the requirements for a no "take" determination from NHESP. The FEIR should describe measures to avoid, minimize and mitigate impacts to rare species habitat, including adjusting work zones to avoid locations with species, time of year restrictions, and restoration. The FEIR should provide an update on the USFWS determination for the federally listed species. The FEIR should provide an update on consultations with NHESP and USFWS.

Introduction

The turtle protection plan submitted to NHESP as part of the MESA Checklist submission is provided as Attachment E. Please note that species specific information has been removed from the plan included in Attachment E due to the fact that this information is considered sensitive material and not suitable for public distribution. In summary, the Plan is designed to prevent to the extent possible direct mortality to the subject turtle caused by construction activities associated with the Project. Key elements to the turtle protection plan include contractor training, handling of active animals encountered during construction, and protection of turtle nests (if found).

State-Protected Species – Consultation Update

According to the most recently published edition of the Massachusetts Natural Heritage Atlas (13th edition, effective October 1, 2008), there are two areas of the ROW within mapped Estimated Habitat ("EH") of Rare Wildlife and Priority Habitat ("PH") of Rare Species. The portion of the ROW adjacent to the Merrimack River falls within EH 65/PH 1321 and north of Methuen Street as EH 636/PH 678.

NEP has previously worked in these areas under their existing NHESP-approved Operation and Maintenance Plan, with no impacts or rare species observances. NEP will continue consultation with NHESP and has recently filed the MESA Checklist with NHESP.

Federally Protected Species-Consultation Update

The Project was also reviewed for the presence of federally listed or proposed, threatened, or endangered species, designated critical habitat, or other natural resources of concern through the United States Fish and Wildlife Service ("USFWS") Information Planning and Conservation ("IPaC") System. The USFWS recently listed the northern long-eared bat (*Myotis septentrionalis*) as threatened, effective May 4, 2015. The USFWS has also issued an interim 4(d) rule that is one of many tools provided by the federal Endangered Species Act ("ESA") to allow for flexibility in the ESA's implementation and to tailor prohibitions to those that make the most sense for protecting and managing at-risk species. Surveys for this species were completed, and no northern long-eared bats were found. As part of Section 7 consultation for the Project's Section 404 project review, the USACE and USFWS have agreed that the project will result in no adverse effect to this species, and time-of-year restrictions on construction of the Project will not be necessary.

Rare Species Avoidance, Minimization, and Mitigation Techniques

Consistent with all of its construction activities, NEP will employ best management practices identified in EG303 NE and as per the existing Operations and Management Plan for work within state listed species habitat between National Grid and NHESP for this Project. These measures include, but may not be limited to, the following:

- Installation of silt fence barriers to block individual turtles from entering the work area;
- Contractor training and education of rare species present;
- Regular environmental monitoring by qualified biologists;
- Daily sweeps of the work area to ensure no turtle species are within it;
- Identification of active nests during the nesting season and installation of exclusion fencing around active nests; and
- Use of timber matting within vegetated wetlands.

6

Mitigation and Section 61 Findings

From the Secretary's Certificate on the Draft EIR

> Mitigation and Section 61 Findings
>
> *The FEIR should include an updated and revised chapter that summarizes proposed mitigation measures and provides individual draft Section 61 Findings for each State Agency that will issue permits for the project. The FEIR should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation.*

Introduction

The following chapter provides a summary of Project impacts and updates to mitigation measures proposed to offset unavoidable environmental impacts and provides individual proposed draft Section 61 Findings for each state agency that will issues permits for the Project. All conditions required in Federal, state and local permits will be strictly adhered to by the Proponent. Final Section 61 Findings issued by State Agencies will be provided to MEPA for publication in *The Environmental Monitor*.

Unavoidable Permanent Wetland Impacts: Replication

Based on the current New England District Compensatory Mitigation Guidance (2010) and previous consultation with the USACE, replication will be provided at a minimum of 2:1 ratio for permanent impacts in Tewksbury and Dracut. Both proposed locations are shown on the plans in Attachment A.

In Tewksbury, the proposed replication is located north of Andover Street/Route 133, on the south side of Wetland 7A and west of the existing access road (Sheet 8 of 29) of the plan set in Attachment A. The replication area will encompass approximately 2,070 square feet to mitigate approximately 953 square feet of permanent fill.

In Dracut, the proposed replication area is located north of Methuen Road, on the north side of Wetland 29 and east of the existing access road and proposed permanent crossing (Sheet 28 of 29) of the plan set in Attachment A). The replication area will encompass approximately 1,700 square feet to mitigate approximately 850 square feet of permanent fill.

Further details regarding the existing and proposed conditions, construction methods, and monitoring at these sites is provided in the Wetland Replication Plan set included in Attachment C. These plans were included in the joint 401/404 Permit application submitted to MassDEP and USACE. These plans are subject to minor revisions dependent upon comments received from regulatory agencies, including the Tewksbury and Dracut Conservation Commissions.

Unavoidable Temporary Wetland Impacts: In-Situ Restoration

Temporary wetland impacts from the placement of timber mats will be restored in-situ. Due to its use as an existing transmission line right-of-way, the proposed area of work has been previously disturbed and NEP has successfully worked in these areas and restored them without any adverse effect. Wherever possible, mats will be placed in the same areas that were used for previous work. Restoration measures will include cleaning of swamp mats, post-mat-removal inspections, restoration of the soil surface, seeding and mulching, removal of erosion controls, invasive species control, and post-restoration inspections as detailed in Chapter 3.

Secondary Impacts: In-Lieu Fee

As described in Chapter 3, NEP is proposing to use the USACE in-lieu fee program, which is administered by the Massachusetts Department of Fish and Game, to mitigate for secondary impacts. Based on the USACE's New England District Compensatory Mitigation Guidance and discussions with the USACE, secondary impacts associated with tree removal in wetlands require mitigation of 15,045 square feet. Based on the coastal service area in-lieu fee rate of $14.26 per square foot, the in-lieu fee amount comes to approximately $214,550.

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Proposed Draft Section 61 Findings
Department of Environmental Protection

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WETLANDS AND WATERWAYS
FINDING PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61

PROJECT NAME:	Merrimack Valley Reliability Project
PROJECT LOCATION:	Tewksbury, Andover, and Dracut, Massachusetts
PROJECT PROPONENT:	New England Power Company, dba NEP ("NEP")
EEA NUMBER:	15283
PERMITS SOUGHT:	401 Water Quality Certification

I. Project Description

The Project involves the installation of a new 345kV electric transmission line ("3124 Line") within an existing right-of-way ("ROW") between the Tewksbury #22A Substation in Tewksbury, Massachusetts, and the Scobie Pond Substation in Londonderry, New Hampshire, owned by the Public Service Company of New Hampshire ("PSNH") d/b/a Eversource Energy. The installation of this new line would relieve potential contingency overloads under various conditions on several elements of the area transmission system. In doing so, the MVRP ensures continued compliance with all applicable federal and regional transmission system reliability standards and criteria, and maintains reliable electric service to customers in the area.

The portion of the MVRP located within Massachusetts that is the subject of this DEIR is referred to herein as "the Project." The Project is proposed on existing ROW within the Towns of Tewksbury, Andover, and Dracut. There are five existing transmission lines located within this ROW (one 345 kV line, two 230 kV lines, and two 115 kV lines[1]), and several of the lines will be reconfigured to accommodate the new 3124 Line. The proposed configuration of the new 3124 Line and the existing lines within the ROW varies over the 6.5-mile length of the ROW within Massachusetts. In some sections, the 3124 Line will be built on newly constructed structures; in other sections one or more of the existing lines will be relocated on a new series of structures and one of the existing lines will be redesignated as the 3124 Line. New structures may include steel H-frame, davit arm, and wood three-pole and single-pole structures. Depending on the structure type, structures will be direct embedded or constructed on a caisson foundation.

Environmental impacts associated with the Project will be limited in nature because the Project will be contained within the existing ROW. Swamp mats may be used to minimize disturbance within wetland resource areas where vehicle access is necessary. To the extent possible, the structures will be accessed directly from existing access ways within the ROW corridor. Crews will use public roads intersecting the ROW and other established access points to enter the transmission corridor.

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[1] At some locations, the ROW also contains a distribution circuit. The 1302, 62L2, and 75L2 distribution circuits all are located within some portion of the Fifteen Mile Falls ROW; however, there is only one distribution circuit on the ROW at any particular location.

II. MEPA History

The Project will require a 401 Water Quality Certification (BRP WW 08) and a minor modification coverage under existing Chapter 91 licenses issued by MassDEP in accordance with the requirements of the Massachusetts Clean Waters Act M.G.L. c. 21, § 26-53, M.G.L. c. 91, and implementing regulations 314 C.M.R 9.00 and 310 C.M.R 9.00.

Pursuant to M.G.L. c. 30, § 61 and 62 A–H of the Massachusetts Environmental Policy Act ("MEPA") and its implementing regulations (301 C.M.R 11.00), the Proponent submitted an Environmental Notification Form ("ENF") to the MEPA Office on or before November 17, 2014. Following a 30-day public review and comment period and an additional 7-day in-house review by MEPA, the Secretary issued on December 24, 2014, the Certificate on the ENF requiring the completion of a Draft Environmental Impact Report ("DEIR").

On or about August 31, the DEIR was filed with MEPA. Following a 30-day public review and comment period and an additional seven-day in-house review by MEPA, the Secretary issued the Certificate on the DEIR on October 16, 2015. On or about January 15, 2016, the FEIR was filed with MEPA. Following a 30-day public review and comment period and an additional seven-day in-house review by MEPA, the Secretary issued the Certificate on the FEIR on February 26, 2016.

The Massachusetts Department of Environmental Protection ("MassDEP") has reviewed and commented on the above MEPA submissions. MassDEP also has considered the comments of various parties on the MEPA document in relation to the subject matter of the applications for permits, reviews, and approvals to be submitted by the Proponent to MassDEP. Accordingly, this Section 61 Finding is based upon information disclosed and discussed in the MEPA review process.

III. Project Impacts

The MVRP will result in minimal and/or temporary environmental impacts because the Project will be contained within the existing ROW. Clearing will be required along discrete areas of the ROW, and permanent fill will be required for the placement of structures. Swamp mats may be used to minimize disturbance within wetland resource areas where vehicle access is necessary. To the extent possible, the structures will be accessed directly from existing roads within the ROW corridor. Crews will use public roads intersecting the ROW and other established access points to enter the transmission corridor.

Wetland impacts from the Project that are subject to local, state, and federal jurisdiction include:

- Permanent wetland fill associated with the placement of new utility structures (local, state and federal);
- Conversion of forested wetlands to either scrub/shrub or emergent wetland types (local, state, and federal);
- Temporary disturbance of wetland resource areas associated with the placement of swamp mats for construction equipment access and work areas (local, state and federal);
- Disturbance and fill within the 100-year floodplain (local and state); and
- Disturbance and fill within the 200-foot Riverfront Area (local and state).

The footprint of each structure is regarded as an impact resulting from permanent fill. These permanent impacts are factored into the mitigation requirements of the USACE.

To facilitate temporary access within wetland resource areas during construction, it may be necessary to place swamp mats within wetland resource areas for access to existing structures, equipment staging, and conductor stringing areas. Swamp mats consist of heavy timbers, planking, and/or other manmade materials joined to form stable platforms that are placed over the surface of wetlands.

The use of swamp mats allows for heavy equipment access within wetland areas. The use of swamp mats minimizes the need to remove vegetation beneath the access way and helps to reduce the degree of soil disturbance and rutting in soft wetland soils. Depending upon the time of year if dry or frozen ground conditions exist, mats may not be necessary to satisfy the performance standards of minimal impact to wetland resources.

The Project will cross the Merrimack River, and the additional conductors and shield wire are subject to Chapter 91 jurisdiction. There are no new structures located within the jurisdictional area, and no in-water work is required. There are already licensed crossings in this location, and the additional conductors and shield wire will be located within the ROW of the existing crossing. It will be at the same or greater height than the existing crossings, such that the Project will not restrict or impair access to or navigation upon the Merrimack River. As such, the Project is a minor modification to the existing, licensed crossings and requires no additional licensing. The Project will meet all applicable standards and requirements under the waterways regulations.

IV. Project Mitigation Measures

Based on local, state and Federal requirements replication will be provided at a minimum of 2:1 ratio for permanent impacts in Tewksbury and Dracut. Both proposed locations are shown on the attached plans and figures.

In Tewksbury, the proposed replication is located north of Andover Street/Route 133, on the south side of Wetland 7A and west of the existing access road (Sheet 8 of 29 of the plan set in Attachment A). The replication area will encompass approximately 2,070 square feet to mitigate approximately 953 square feet of permanent fill.

In Dracut, the proposed replication area is located north of Methuen Road, on the north side of Wetland 29 and east of the existing access road and proposed permanent crossing (Sheet 28 of 29) of the plan set in Attachment A). The replication area will encompass approximately 1,700 square feet to mitigate approximately 850 square feet of permanent fill.

Temporary impacts from swamp mats will be mitigated through in-situ restoration. In accordance with discussions with the USACE, compensatory mitigation for secondary impacts will be addressed through payment to the USACE in-lieu fee program. Based on the USACE's New England District Compensatory Mitigation Guidance and discussions with the USACE, secondary impacts associated with tree removal in wetlands and in stream buffers is 100,287 square feet, which must be mitigated at 15% of the standard ratio for permanent fill, which equals 15,045 square feet. Using the coastal service area in-lieu fee rate of $14.26 per square foot, the in-lieu fee payment will be approximately $214,550.

No impacts are anticipated at the Merrimack River crossing and not mitigation is required for the crossing.

Because Project construction activities will disturb an area in excess of one acre of land, the Project will need to comply with the National Pollution Discharge Elimination System ("NPDES") General Permit for Construction Activities. As part of this requirement, a Storm Water Pollution Prevention Plan ("SWPPP") will be prepared for the Project. As part of that plan, strict adherence to the application and maintenance of erosion and sedimentation control devices is required. To ensure this compliance, NEP requires that environmental inspectors be present on a regular basis during construction to ensure compliance with NPDES, SWPPP, and other permit requirements. Regular duties of the environmental inspectors include inspection of the installation and maintenance of sedimentation and erosion control devices and other best management practices, documentation of construction activities, reporting of non-compliance with SWPPP and other applicable environmental permit requirements, reporting to regulatory agencies, and assisting the construction supervisor with ensuring permit compliance when unforeseen circumstances arise. Environmental monitoring typically continues beyond normal construction activities until all disturbed areas on the site have been stabilized by the application of standard site stabilization BMPs or restored as necessary.

V. Findings

Based upon its review of the MEPA documents, the permit applications, and Massachusetts Regulations, the MassDEP finds that the terms and conditions to be incorporated into the 401 Water Quality Certificate required for this Project constitute all feasible measures to avoid damage to the environment and will minimize and mitigate such damage to the maximum extent practicable for those impacts subject to MassDEP's authority. Implementation of the mitigation measures will occur in accordance with the terms and conditions 401 Water Quality Certification.

Martin Suuberg, MassDEP Commissioner

Date

Proposed Draft Section 61 Findings
Department of Public Utilities

DEPARTMENT OF PUBLIC UTILITIES
FINDING PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61

PROJECT NAME:	Merrimack Valley Reliability Project
PROJECT LOCATION:	Tewksbury, Andover, and Dracut, Massachusetts
PROJECT PROPONENT:	New England Power Company d/b/a NEP
EEA NUMBER:	15283
PERMITS SOUGHT:	M.G.L. c. 164, § 72 – Petition to Construct M.G.L. c. 40A, § 3 – Zoning Exemptions

I. Project Description

The Project involves the installation of a new 345kV electric transmission line ("3124 Line") within an existing right-of-way ("ROW") between the Tewksbury #22A Substation in Tewksbury, Massachusetts, and the Scobie Pond Substation in Londonderry, New Hampshire, owned by the Public Service Company of New Hampshire ("PSNH") d/b/a Eversource Energy. The installation of this new line would relieve potential contingency overloads under various conditions on several elements of the area transmission system. In doing so, the MVRP ensures continued compliance with all applicable federal and regional transmission system reliability standards and criteria, and maintains reliable electric service to customers in the area.

The portion of the MVRP located within Massachusetts that is the subject of this DEIR is referred to herein as "the Project." The Project is proposed on existing ROW within the Towns of Tewksbury, Andover, and Dracut. There are five existing transmission lines located within this ROW (one 345 kV line, two 230 kV lines, and two 115 kV lines[2]), and several of the lines will be reconfigured to accommodate the new 3124 Line. The proposed configuration of the new 3124 Line and the existing lines within the ROW varies over the 6.5-mile length of the ROW within Massachusetts. In some sections, the 3124 Line will be built on newly constructed structures; in other sections one or more of the existing lines will be relocated on a new series of structures and one of the existing lines will be redesignated as the 3124 Line. New structures may include steel H-frame, davit arm, and wood three-pole and single-pole structures. Depending on the structure type, structures will be direct embedded or constructed on a caisson foundation.

Environmental impacts associated with the Project will be limited in nature because the Project will be contained within the existing ROW. Swamp mats may be used to minimize disturbance within wetland resource areas where vehicle access is necessary. To the extent possible, the structures will be accessed directly from existing access ways within the ROW corridor. Crews will use public roads intersecting the ROW and other established access points to enter the transmission corridor.

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[2] At some locations, the ROW also contains a distribution circuit. The 1302, 62L2, and 75L2 distribution circuits all are located within some portion of the Fifteen Mile Falls ROW; however, there is only one distribution circuit on the ROW at any particular location.

II. MEPA History

The Project will require a Petition to Construct and Zoning Exemptions issued by the Massachusetts Department of Public Utilities ("DPU") in accordance with the requirements of M.G.L. c. 164, § 72 and M.G.L. c. 40A, § 3.

Pursuant to M.G.L. c. 30, § 61 and 62 A–H of the Massachusetts Environmental Policy Act ("MEPA") and its implementing regulations (301 C.M.R 11.00), the Proponent submitted an Environmental Notification Form ("ENF") to the MEPA Office on or before November 17, 2014. Following a 30-day public review and comment period and an additional 7-day in-house review by MEPA, the Secretary issued on December 24, 2014, the Certificate on the ENF requiring the completion of a Draft Environmental Impact Report ("DEIR").

On or about August 31, 2016 the DEIR was filed with MEPA. Following a 30-day public review and comment period and an additional seven-day in-house review by MEPA, the Secretary issued the Certificate on the DEIR on October 16, 2015. On or about January 15, 2016, the FEIR was filed with MEPA. Following a 30-day public review and comment period and an additional seven-day in-house review by MEPA, the Secretary issued the Certificate on the FEIR on February 26, 2016.

The DPU has reviewed and commented on the above MEPA submissions. DPU also has considered the comments of various parties on the MEPA document in relation to the subject matter of the applications for permits, reviews, and approvals to be submitted by the Proponent to DPU. Accordingly, this Section 61 Finding is based upon information disclosed and discussed in the MEPA review process.

III. Project Impacts

Overall, land use impacts will be minimal because the Project will be located within an existing ROW. No expansion of the ROW is required. The construction and operation of the Project has been planned to minimize effects on residential, commercial, and industrial land uses.

In most locations, the ROW where the Project will be located is cleared to nearly its full extent. However, there are some limited locations where this is not the case and tree removal will be required. Project construction is anticipated to result in unavoidable temporary and permanent impacts to vegetated wetland resources within the Project ROW. These impacts include temporary disturbance caused by the placement of timber mats for access of construction equipment; conversion of forested wetlands to either scrub/shrub or emergent wetland types; and permanent fill associated with the placement of structures and access road improvements.

The Company will take a number of measures to avoid impacts to groundwater and drinking water supplies from the Project. Following construction, the normal operation and maintenance of the transmission line facilities will have no impact on groundwater resources.

The Project ROW crosses the Merrimack River and several perennial and intermittent streams. The Project has been designed so that no machinery or equipment will operate below the Mean High Water ("MHW") line of the Merrimack River. The Project will not restrict or impair access to or navigation upon the Merrimack River and the Project will meet all applicable standards and requirements under the waterways regulations.

The Project will be designed to comply with the MassDEP Stormwater Management Policy (2008) and applicable town stormwater and erosion control regulations. Additionally, the Company and its contractors will obtain coverage under the National Pollutant Discharge Elimination System ("NPDES") Construction General Permit. A Storm Water Pollution Prevention Plan ("SWPPP") will be prepared prior to the start of construction.

The Massachusetts Natural Heritage & Endangered Species Program ("NHESP") has identified areas of known Priority Habitat ("PH") and Estimated Habitat ("EH") within the Project ROW. The Project corridor is also potential habitat for a federally listed species. Based on consultation with NHESP, the Project is not expected to result in a "take" of state-listed species and will not require a Conservation and Management Permit. Surveys are in progress for the federally listed species and NEP will work with USFWS to determine the appropriate next steps once the surveys are complete.

IV. Project Mitigation Measures

Based on local, state and Federal requirements replication will be provided at a minimum of 2:1 ratio for permanent impacts in Tewksbury and Dracut. Both proposed locations are shown on the attached plans and figures.

In Tewksbury, the proposed replication is located north of Andover Street/Route 133, on the south side of Wetland 7A and west of the existing access road (Sheet 8 of 29 of the plan set in Attachment A). The replication area will encompass approximately 2,070 square feet to mitigate approximately 953 square feet of permanent fill.

In Dracut, the proposed replication area is located north of Methuen Road, on the north side of Wetland 29 and east of the existing access road and proposed permanent crossing (Sheet 28 of 29) of the plan set in Attachment A). The replication area will encompass approximately 1,700 square feet to mitigate approximately 850 square feet of permanent fill.

Temporary impacts from swamp mats will be mitigated through in-situ restoration. In accordance with discussions with the USACE, compensatory mitigation for secondary impacts will be addressed through payment to the USACE in-lieu fee program. Based on the USACE's New England District Compensatory Mitigation Guidance and discussions with the USACE, secondary impacts associated with tree removal in wetlands and in stream buffers is 100,287 square feet, which must be mitigated at 15% of the standard ratio for permanent fill, which equals 15,045 square feet. Using the coastal service area in-lieu fee rate of $14.26 per square foot, the in-lieu fee payment will be approximately $214,550.

No impacts are anticipated at the Merrimack River crossing, and the Project will proceed as a minor modification to existing Chapter 91 licenses for crossings of the river.

Because Project construction activities will disturb an area in excess of one acre of land, the Project will need to comply with the National Pollution Discharge Elimination System ("NPDES") General Permit for Construction Activities. As part of this requirement, a Storm Water Pollution Prevention Plan ("SWPPP") will be prepared for the Project. As part of that plan, strict adherence to the application and maintenance of erosion and sedimentation control devices is required. To ensure this compliance, NEP requires that environmental inspectors be present on a regular basis during construction to ensure compliance with NPDES, SWPPP, and other permit requirements. Regular duties of the environmental inspectors include inspection of the installation and maintenance of sedimentation and erosion control devices and other best management practices, documentation of construction activities, reporting of non-compliance with SWPPP and other applicable environmental permit requirements, reporting to regulatory agencies, and assisting the construction supervisor with ensuring permit compliance when unforeseen circumstances arise. Environmental monitoring typically continues beyond normal construction activities until all disturbed areas on the site have been stabilized by the application of standard site stabilization BMPs or restored as necessary.

V. Findings

Based upon its review of the MEPA documents, the permit applications, and Massachusetts Regulations, the Massachusetts DPU finds that the terms and conditions to be incorporated into the "Final Decision" required for this Project constitute all feasible measures to avoid damage to the environment and will minimize and mitigate such damage to the maximum extent practicable for those impacts subject to the Massachusetts DPU's authority. Implementation of the mitigation measures will occur in accordance with the terms and conditions set forth in the "Final Decision" for DPU File No. 15-44 and 15-45.

Angela M. O'Conner, MassDPU Chairman — Date

Proposed Draft Section 61 Findings
Department of Transportation

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
FINDING PURSUANT TO
M.G.L. CHAPTER 30, SECTION 61

PROJECT NAME:	Merrimack Valley Reliability Project
PROJECT LOCATION:	Tewksbury, Andover, and Dracut, Massachusetts
PROJECT PROPONENT:	New England Power Company d/b/a NEP
EEA NUMBER:	15283
PERMITS SOUGHT:	Non-vehicular Access Permit

I. Project Description

The Project involves the installation of a new 345kV electric transmission line ("3124 Line") within an existing right-of-way ("ROW") between the Tewksbury #22A Substation in Tewksbury, Massachusetts, and the Scobie Pond Substation in Londonderry, New Hampshire, owned by the Public Service Company of New Hampshire ("PSNH") d/b/a Eversource Energy. The installation of this new line would relieve potential contingency overloads under various conditions on several elements of the area transmission system. In doing so, the MVRP ensures continued compliance with all applicable federal and regional transmission system reliability standards and criteria, and maintains reliable electric service to customers in the area.

The portion of the MVRP located within Massachusetts that is the subject of this DEIR is referred to herein as "the Project." The Project is proposed on existing ROW within the Towns of Tewksbury, Andover, and Dracut. There are five existing transmission lines located within this ROW (one 345 kV line, two 230 kV lines, and two 115 kV lines[3]), and several of the lines will be reconfigured to accommodate the new 3124 Line. The proposed configuration of the new 3124 Line and the existing lines within the ROW varies over the 6.5-mile length of the ROW within Massachusetts. In some sections, the 3124 Line will be built on newly constructed structures; in other sections one or more of the existing lines will be relocated on a new series of structures and one of the existing lines will be redesignated as the 3124 Line. New structures may include steel H-frame, davit arm, and wood three-pole and single-pole structures. Depending on the structure type, structures will be direct embedded or constructed on a caisson foundation.

Environmental impacts associated with the Project will be limited in nature because the Project will be contained within the existing ROW. Swamp mats may be used to minimize disturbance within wetland resource areas where vehicle access is necessary. To the extent possible, the structures will be accessed directly from existing access ways within the ROW corridor. Crews will use public roads intersecting the ROW and other established access points to enter the transmission corridor.

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[3] At some locations, the ROW also contains a distribution circuit. The 1302, 62L2, and 75L2 distribution circuits all are located within some portion of the Fifteen Mile Falls ROW; however, there is only one distribution circuit on the ROW at any particular location.

II. MEPA History

The Project will require approvals in the form of Non-vehicular Access Permits from MassDOT for crossing over State Highways and Railbeds under its jurisdiction.

Pursuant to M.G.L. c. 30, § 61 and 62 A–H of the Massachusetts Environmental Policy Act ("MEPA") and its implementing regulations (301 C.M.R 11.00), the Proponent submitted an Environmental Notification Form ("ENF") to the MEPA Office on or before November 17, 2014. Following a 30-day public review and comment period and an additional 7-day in-house review by MEPA, the Secretary issued on December 24, 2014, the Certificate on the ENF requiring the completion of a Draft Environmental Impact Report ("DEIR").

On or about August 31, 2015, the DEIR was filed with MEPA. Following a 30-day public review and comment period and an additional seven-day in-house review by MEPA, the Secretary issued the Certificate on the DEIR on October 16, 2015. On or about January 15, 2016, the FEIR was filed with MEPA. Following a 30-day public review and comment period and an additional seven-day in-house review by MEPA, the Secretary issued the Certificate on the FEIR on February 26, 2016.

MassDOT has reviewed and commented on the above MEPA submissions. MassDOT also has considered the comments of various parties on the MEPA documents in relation to the subject matter of the applications for permits, reviews, and approvals to be submitted by the Proponent to MassDOT. Accordingly, this Section 61 Finding is based upon information disclosed and discussed in the MEPA review process.

III. Project Impacts

The Project will result in temporary traffic impacts during construction. Intermittent construction-related traffic will occur over the entire construction period, particularly at the intersections of the ROW and public roadways. Construction vehicles and equipment will typically enter the ROW from public roadway crossings.

The Project crosses public roadways in five locations in Tewksbury, including I-495 and Route 133; in two locations in Andover; and in five locations in Dracut, including Routes 110 and 113.

Because each of the construction tasks will occur at different times and locations over the course of construction, traffic will be intermittent at these entry roadways. Vehicle sizes will range from pick-up trucks to heavy construction equipment.

IV. Project Mitigation Measures

NEP will coordinate closely with state transportation authorities to develop an acceptable TMP for work within state highways including in Tewksbury, including I-495 and Route 133; in two locations in Andover; and in five locations in Dracut, including Routes 110 and 113. NEP will coordinate with local authorities for work on local streets and roads. In general, construction vehicles will be parked and/or operated off the public roadways. At locations where construction equipment must be staged in a public way, the contractors will follow a pre-approved work zone traffic control plan. Traffic control plans will be developed in consistency with the Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways and MassDOT's Work Zone Safety Guidelines for Massachusetts Municipalities and Contractors.

Temporary guard structures will be deployed at roads and other utility crossings to support the wires over the roadway, minimizing traffic delays and preventing accidental contact with the conductor during installation. Where appropriate, a police detail will be present at roadway crossing work sites during the wire-pulling operation. Additional police details may be used during high-traffic-volume periods.

Signs identifying construction work zones will be posted in accordance with site-specific requirements. Flag persons will be used to direct traffic as needed. Site-specific traffic plans may be developed as required by authorities having jurisdiction over the roadways. Travel routes used to transport material to and from the work sites will generally follow the shortest accessible roads near the transmission line ROW. Delivery of oversized materials such as structures will be scheduled so as not to conflict with commuting hours.

NEP will assign personnel to the Project who will be responsible for communicating Project schedules to municipalities and residences as construction progresses. In addition, NEP will obtain any required permits to work within state highway layouts. These permits are generally conditioned with allowable work days, allowable work hours, and maximum traffic delay and traffic stop times.

V. Findings

Based upon its review of the MEPA documents, the permit applications, and Massachusetts Regulations, the Massachusetts Department of Transportation finds that the terms and conditions to be incorporated into the Non-vehicular Access Permits required for this Project constitute all feasible measures to avoid damage to the environment and will minimize and mitigate such damage to the maximum extent practicable for those impacts subject to MassDOT's authority.

Thomas Tinlin, Acting Highway Administrator

Date

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Response to Comments/Circulation

From the Secretary's Certificate on the Draft EIR

Response to Comments

The FEIR should contain a copy of this Certificate and of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the FEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the FEIR beyond what has been expressly identified in this certificate. The Proponent may use either an indexed response to comments format, or a direct narrative response.

Response to Comments

This chapter provides Responses to the Comments received by the Secretary of Energy and Environmental Affairs on Merrimack Valley Reliability Project Draft Environmental Impact Report (DEIR) (EEA #15283). All Project comments, as they relate to the Scope of the Final EIR issued by the Secretary, are included below in *italics* and presented verbatim as received. Editorial comments that are not directly relevant to the Project review as outlined by the Secretary's Certificate are not addressed.

Complete copies of the Secretary's Certificate and comment letters received on the DEIR are included in Attachment G – Secretary's Certificate and Comments Letters Received on the DEIR.

Table 7-1
Comment Letters Received on the DEIR

Letter #	Author
1	MassDEP-NERO – 10/08/15
2	MDF&W - NHESP – 10/09/15
3	NMCOG – 10/09/15

DEIR Comment Letter 1
MassDEP-NERO

DEIR Comment 1.1

The extent of tree removal and conversion of forested wetland to shrub/scrub or emergent wetland has not been established, and the impacts within each affected town are not explained. The FEIR should provide this basic, wetland impact information to show that the changes are in accordance with the requirements for wetlands permitting and 401 Water Quality Certification. Conversion of wetland type can have significant impacts beginning with construction work and over time. As additional mitigation measures may be needed, this issue should be addressed in greater detail in the FEIR.

Response:

Approximately 100,287 sf of tree removal and conversion of forested wetland to shrub/scrub or emergent wetland is proposed. Refer to Tables 3-5 and 3-6 in Chapter 3, which provide a summary of the locations for wetland conversion.

As discussed in Chapter 3, since there were no viable land preservation options, NEP turned to the in-lieu fee option as mitigation for unavoidable permanent and temporary wetland impacts. Based on discussions with the USACE, secondary impacts associated with tree removal in wetlands and in-stream buffers is 100,287 sf, which will be mitigated at 15% of the standard ratio for permanent fill through the use of the in-lieu fee program. Using the coastal service area rate per square foot of $14.26 and a total of 15,045 square feet of secondary impacts, the in-lieu fee amount comes to $214,550.

DEIR Comment 1.2

The narrative is unclear how the construction work and impacts in pull pad sites differ from the impacts on construction work pads; and in particular, how the deployment of these pads would impact wetlands resources. Information to address this issue should be provided in the FEIR narrative, including a description of the secondary impacts to wetland resources.

Response:

The longer rectangular shape accounts for the need to set up the wire pulling equipment such that there is the recommended distance between the attachment point on the structure the wire is being pulled from and the equipment (generally an offset of three times the vertical distance from the attachment point on the structure to the ground). In addition, reel stands holding the wire to be installed are set up behind the equipment accomplishing the pulling, which in turn creates the need for a larger footprint.

DEIR Comment 1.3

The DEIR reported discussions with the NHESP indicate that it may be possible to avoid a "take" of rare species with a reptile protection plan. The FEIR should address this issue in greater detail to confirm that a protection plan will be sufficient to satisfy NHESP requirements. To the extent feasible, this plan also should be provided or explained.

Response:

Please refer to Chapter 5 for a detailed discussion of rare species and turtle protection plans.

DEIR Comment 1.4

To minimize damage to wetland resource areas, swamp mats will be used to support construction equipment, and stream crossings will comply with the applicable sections of the Massachusetts River and Stream Crossing Standards. MassDEP requests confirmation in the FEIR that the mats will be deployed within the timeframes specified in the March 2015 Programmatic General Permit promulgated by the USACE.

Response:

The Proponent confirms that the swamp mats will be deployed within the timeframes specified in the USACE March 2015 Programmatic General Permit. No swamp mats will remain in place at any one location longer than 24 months.

DEIR Comment 1.5

The DEIR acknowledges that regulations for the 401 Water Quality Certification require wetlands replication at a rate of at least 1:1 for bordering and isolated vegetated wetlands and land under water. It also is reported in the response to comments from MassDEP that replication would be provided at a 2:1 ratio; replication is being considered in Tewksbury and Dracut. Since there are no details on the wetland mitigation, this information is requested in the FEIR.

Response:

Based on the current New England District Compensatory Mitigation Guidance (2010) and previous consultation with the USACE, replication will be provided at a minimum of 2:1 ratio for permanent impacts in Tewksbury and Dracut. Both proposed locations are shown on the plans in Attachment A.

In Tewksbury, the proposed replication is located north of Andover Street/Route 133, on the south side of Wetland 7A and west of the existing access road (Sheet 8 of 29 of the plan set in Attachment A). The replication area will encompass approximately 2,070 square feet to mitigate approximately 953 square feet of permanent fill.

In Dracut, the proposed replication area is located north of Methuen Road, on the north side of Wetland 29 and east of the existing access road and proposed permanent crossing (Sheet 28 of 29) of the plan set in Attachment A). The replication area will encompass approximately 1,700 square feet to mitigate approximately 850 square feet of permanent fill.

DEIR Comment 1.6

The Department recommends that the proponent arrange a pre-application meeting with the WRP prior to filing a Waterways License application to better understand the extent of work occurring within Chapter 91 jurisdiction.

Response:

The Notice of Minor Project Modification was submitted to MassDEP on November 6, 2015. On January 7, 2016 DEP issued a letter indicating that the Project activity constitutes a minor project modification, and that the proposed activity does not require a license. The DEP letter is included at the end of Chapter 4.

nationalgrid

DEIR Comment Letter 2
MDF&W - NHESP

The Proponent appreciates the consultation process that has occurred to date and looks forward to continued communications as Project permitting continues and a Determination of 'No Take' of state-listed species by the NHESP can be made.

The MESA checklist, which includes the turtle protection plan, has recently been submitted to NHESP (Tracking No. 14-33909). The draft turtle protection plan is included here in Attachment E.

DEIR Comment Letter 3
NMCOG

DEIR Comment 3.1

We appreciate the creation of an Aesthetics Improvement Plan in association with NEP work at #22A Substation. The plan should specify that the view shed will not be degraded by the installation of new lines or the reconfiguration of old lines. In addition, National Grid should ensure the use of native vegetation and the use of pollinator-friendly species of flowering plants appropriate for the Eastern Broadleaf Forest Eco-Region. This plan should be included with the Final Environmental Impact Report (FEIR).

Response:

The Aesthetics Improvement Plan was developed as mitigation for a project to rebuild the Tewksbury #22A Substation. The Tewksbury #22A Rebuild Project is being undertaken independently of the Merrimack Valley Reliability Project to address various asset condition needs. The screening plantings along Route 38 included in the plan were installed in the fall of 2015.

DEIR Comment 3.2

As stated in our ENF comments, a buffer should be installed and maintained at all roadway crossings and wetlands in the area of Route 38 Main Street to enhance the visual aesthetics, while also filtering stormwater. In response to this comment, the Certificate issued on December 24, 2014, stated that the DEIR should "include a discussion of providing a vegetative buffer of roadway crossings ". While the DEIR addresses the aesthetics of the area (see above), there is no discussion of buffers. The concept of adding a buffer should be discussed and incorporated into the Mitigation Chapter of the FEIR.

Response:

The vegetative buffer along Route 38 was part of the agreed mitigation for an independent project to rebuild Tewksbury #22A. The Merrimack Valley Reliability Project has no impact on the viewshed from Route 38. At this time, the Company does not plan to install any additional buffers along project roadway crossings.

DEIR Comment 3.3

As stated in our ENF letter, Tewksbury is working to promote the accessibility of healthy activities such as bicycling, walking, hiking and running. In response to this comment, the Secretary's Certificate stated that the Proponent should consult with the Town of Tewksbury regarding opportunities for recreational use of the ROW.

There is no indication that this consultation occurred. A discussion of the opportunities for recreation and use of the ROW should be included in the FEIR.

Response:

Portions of the ROW are not owned by NEP and NEP cannot grant access. In addition, due to safety and other considerations, use of an electrical transmission corridor for recreational activities is not encouraged.

DEIR Comment 3.4

NMCOG has consulted with the Town of Dracut (Attachment 1). In Dracut, the ROW passes through six parcels that are designated as Protected or Recreational Open Space. In our ENF comment letter, we requested that each parcel be mapped, with disturbances clearly delineated, and with accompanying text describing impacts and mitigation. National Grid responded that disturbances will be "minimal" in this area, and that they do not believe the requested mapping will provide any additional benefit. NMCOG believes impacts to these open space parcels should be explained in chapter/section called Open Space in the FEIR. Mitigation measures should also be described.

Response:

Open space and recreation properties along the proposed Project route were identified using MassGIS land use data layers. Five parcels that intersect the Project ROW were identified as protected or recreational open space and are listed in the following table.

Protected or Recreational Open Space

Open Space	Town	Map/Lot	Owner
Pheasant Ridge Green Area	Andover	230-6C	Dracut Land Trust
Ritchie Conservation Restriction	Dracut	55-0-6	Lecynski Family Partnership
Brox Conservation Restriction	Dracut	39-0-3	Lecynski Family Partnership
Dumaresq Farm	Dracut	38-0-35	Town of Andover
Smith/Healy Farm	Dracut	21-16-1	Ritchie Jr., Marvin W. and Heidi M.

These parcels may be subject to preservation or conservation restrictions; however, NEP's rights predate all such restrictions and are not subject to the same. Accordingly, NEP's rights within these areas on its existing ROW allow for the construction of the proposed Project.

There is also one trail that crosses the ROW on the south bank of the Merrimack River on Company-owned property in Andover. This trail is part of the Bay Circuit Trail, a recreational trail extending through 34 towns in eastern Massachusetts. The trail at this location also serves as part of the Pennacook Trail and the Merrimack River Trail. Construction and operation of the Project will have no impact on the trail. The Company's Real Estate and Stakeholder Relations groups have been in communication with representatives of the Andover Village Improvement Society ("AVIS") and the Bay Circuit Alliance, who represent the interests of the Bay Circuit Trail. As per these conversations it was agreed that the Company will continue to communicate with both organizations well in advance of construction regarding the timing of closures and to coordinate the posting of proper signage along the trail. At this point in the Project, the Company does not have a detailed schedule for the work required in this area. Once this information is available, the Company will provide AVIS and municipal officials, notification of the pending trail closure, the anticipated timeframe for re-opening, and any other related construction details. The Company will also be responsible for creating and installing signage, in coordination with the AVIS representatives, in advance of the closure to notify users.

The Project ROW crosses two farms, located off Parker Road and Wheeler Road in Dracut. Nine (9) new structures are proposed and four structures will be removed on one property; and, seven (7) new structures are proposed and four existing structures to be removed on the other. The Company has completed work on both of these properties in the past, as there are existing transmission lines on both. Typically, both of these landowners request that the Company utilize timber mats to support all heavy equipment during construction while working within and accessing through existing field areas. As has been the case, the Company will work with the landowners to minimize impact to agricultural lands for this Project.

DEIR Comment 3.5

The DEIR states that parcels PH678 and EH636 in Andover and Dracut contain habitat for turtle and salamander species. The Proponent indicates they are consulting with NHESP and that a Reptile Protection Plan will be put in place to avoid a "take". The Reptile Protection Plan should be provided with the FEIR so that we may review and comment accordingly. NMCOG staff notes that salamanders are amphibians, not reptiles, therefore, the FEIR should describe any mitigation needed to protect the salamanders of concern.

Response:

The Company has submitted a MESA Checklist filing to the NHESP. This filing includes a habitat and impact assessment for all state-listed species within the mapped estimated and Priority Habitats. Based on pre-application meetings and discussions with NHESP it is not expected that any unique mitigation measures will be required that are not already included in NEP's NHESP approved operations and management plan instituted to protect state-listed amphibians. NHESP will evaluate the MESA Checklist filing and as necessary include any mitigation measures for state-listed species within their determination.

DEIR Comment 3.6

The Certificate indicates that the DEIR should include a commitment to prepare a Traffic Management Plan (TMP] to maintain safe and efficient access for all modes of travel in the vicinity of access points to the ROW. The TMP should be included with the FEIR so that there is opportunity for public review and comment.

Response:

The Company is committed to preparing appropriate Traffic Management Plans and site-specific Temporary Traffic Control Plans ("TTCPs") as part of the state and local permitting for roadway crossings. To date, the Company has not filed Non-vehicular Highway Access Permits with MassDOT or local road crossing permits with the municipalities along the Project; however, as part of the permitting process, it is anticipated that review and input from local authorities will be required.

At a minimum, TTCPs and State Police details will be used at all crossings of state highway rights-of-way in accordance with MassDOT standards. In addition, local police details will be used at local road crossings as requested by each municipality through the road crossing permitting process to be completed. It is anticipated that police details will be utilized at the following locations to warn motorists of the work area and of the temporary traffic control measures ahead:

- Placement on the shoulders and median areas of I-495 north and south;
- Placement on the left and right sides of Route 133;
- Placement on the shoulders on both sides of Route 110; and
- Placement on local roadway crossings as requested by the municipality with jurisdiction over the roadway.

Further, it is expected that this work will be conducted during low-volume/non-commuting off-peak traffic periods as coordinated with the jurisdictional agency or municipality. Additional details on the locations and times for when police details will be needed will developed as the project progresses through final design and permitting.

From the Secretary's Certificate on the Draft EIR

Circulation

In accordance with Section 11.16 of the MEPA Regulations and as modified by this Certificate, the Proponent should circulate a hard copy of the FEIR to each State and City Agency from which the Proponent will seek permits or approvals. The Proponent must circulate a copy of the FEIR to all other parties that submitted individual written comments. Per 301 CMR 11.16(5), the Proponent may circulate copies of the FEIR to these other parties in CD-ROM format or by directing commenters to a project website address. However, the Proponent should make available a reasonable number of hard copies to accommodate those without convenient access to a computer and distribute these upon request on a first-come, first-served basis. The Proponent should send correspondence accompanying the CD-ROM or website address indicating that hard copies are available upon request, noting relevant comment deadlines, and appropriate addresses for submission of comments. A CD-ROM copy of the filing should also be provided to the MEPA Office. A copy of the FEIR should be made available for review at the Tewksbury, Andover, and Dracut public libraries.

Final EIR Distribution

In accordance with the MEPA regulations at 301 CMR 11.16, the Proponent is distributing/circulating this Final EIR for the Merrimack Valley Reliability Project to the public agencies listed below. Notice of the availability of this Final EIR will be published in the January 20, 2016 edition of *The Environmental Monitor*, initiating a 30-day public comment period that will end on or about February 19, 2016.

NOTE: For those receiving CD-ROMs you may request a hard copy of the report, as necessary. Please contact Marc Bergeron at VHB, Inc. 508-752-1001 or by email, mbergeron@vhb.com.

Commonwealth of Massachusetts

Secretary Matthew Beaton
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Department of Public Utilities
One South Station
Boston, MA 02110

Department of Environmental Protection
Commissioner's Office
One Winter Street
Boston, MA 02108

MassDEP/Northeast Regional Office
Attn: MEPA Coordinator
205B Lowell Street
Wilmington, MA 01887

MassDOT Public/Private Development Unit
10 Park Plaza
Boston, MA 02116

MassDOT District #4
Attn: MEPA Coordinator
519 Appleton Street
Arlington, MA 02476

Massachusetts Historical Commission
The MA Archives Building
220 Morrissey Boulevard
Boston, MA 02125

Merrimack Valley Planning Commission
160 Main Street
Haverhill, MA 01830-5000

Northern Middlesex Council of Governments
40 Church Street, Suite 200
Lowell, MA 01852-2686

Department of Agricultural Resources
Attn: MEPA Coordinator
16 West Experiment Station
University of Massachusetts
Amherst MA 01003

Natural Heritage and Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

Town of Andover - CDs

Andover Board of Selectmen
Town Offices
36 Bartlet Street
Andover, MA 01810

Andover Planning Board
Town Offices
36 Bartlet Street
Andover, MA 01810

Andover Conservation Commission
Town Offices
36 Bartlet Street
Andover, MA 01810

Andover Board of Health
Town Offices
36 Bartlet Street
Andover, MA 01810

Andover Public Library (Hard Copy)
2 North Main Street
Andover, MA 01810

Town of Dracut - CDs

Dracut Board of Selectmen
62 Arlington Street
Dracut, MA 01826

Dracut Planning Board
11 Spring Park Ave
Dracut, MA 01826

Dracut Conservation Commission
11 Spring Park Ave
Dracut, MA 01826

Dracut Board of Health
Town Hall Annex
11 Springpark Avenue
Dracut, MA 01826

Dracut Public Library (Hard Copy)
28 Arlington Street
Dracut, MA 1826

Town of Tewksbury - CDs

Tewksbury Board of Selectmen
1009 Main St # 1
Tewksbury, MA 01876

Tewksbury Planning Board
999 Whipple Rd
Tewksbury, MA 01876

Tewksbury Conservation Commission
999 Whipple Rd
Tewksbury, MA 01876

Tewksbury Board of Health
Senior Center
175 Chandler Street
Tewksbury, MA 01876

Tewksbury Public Library
300 Chandler Street
Tewksbury, MA 01876

Parties Commenting on the ENF - CDs

Lawrence Panfil
17 Cart Path Road
Dracut, MA 01826

Rich Cowan
12 Greenlawn Ave.
Dracut, MA 01826

New Hampshire Transmission LLC
700 Universe Blvd
Juno Beach, FL 33480

Northern Middlesex Council of Governments
40 Church Street
Suite 200
Lowell, MA 01852-2686

Keith Saxon
15 Wethersfield Drive
Andover, MA 01810

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Attachment A

Merrimack Valley Reliability Project

Tewksbury, Andover, Dracut, Massachusetts

Project Plan Set

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Pre-Construction Notification Application
under Massachusetts General Permit and
Individual Water Quality Certificate Application

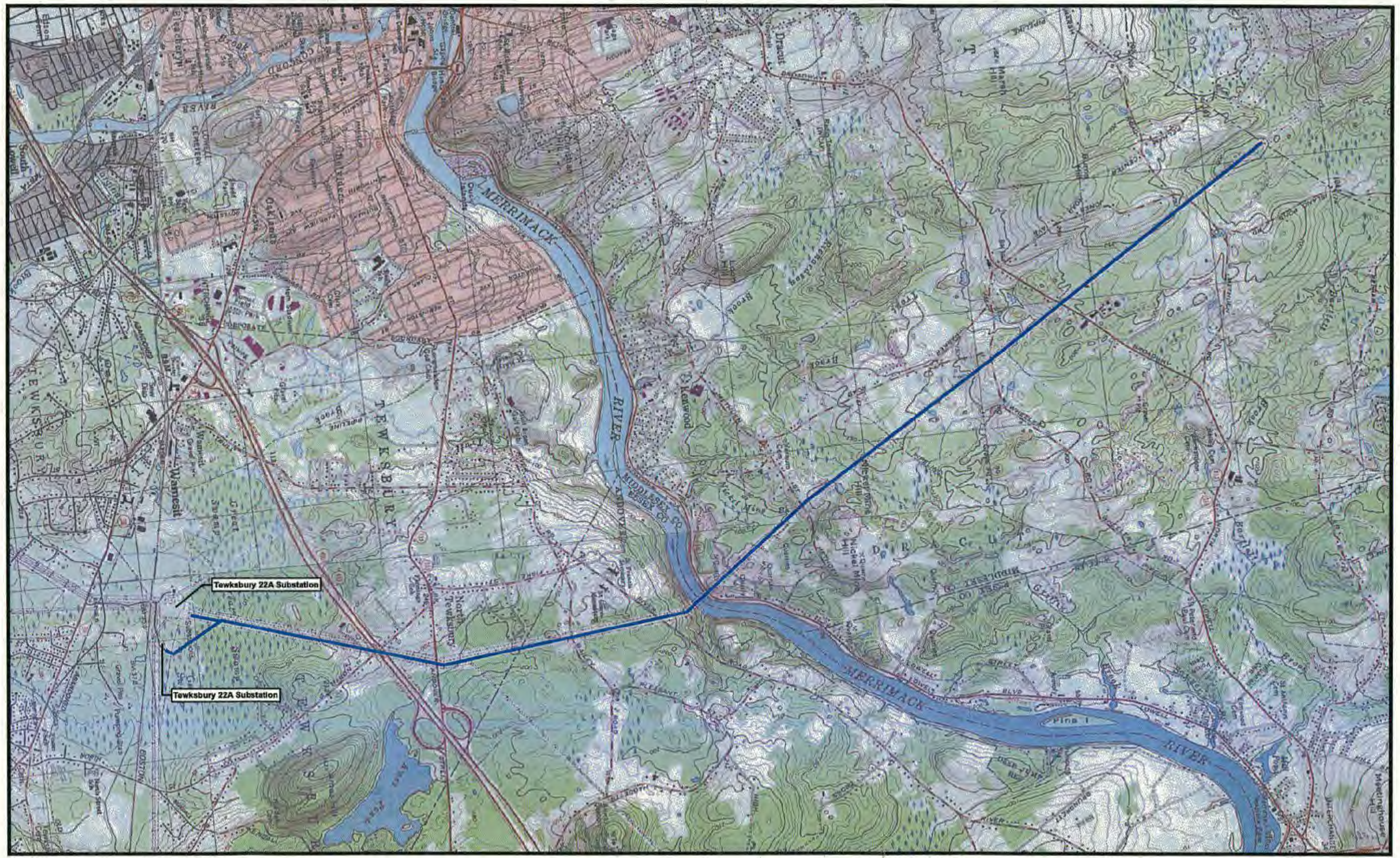
Merrimack Valley Reliability Project

Tewksbury, Andover, and Dracut, MA

Date Issued: XXXX
Revised: January 6, 2016

Sheet Index

Number	Drawing Title	Latest Issue
A-1	Wetland Delineation Notes	7/9/2015
A-2	General Construction Notes	7/9/2015
1-29	Plan Sheets	1/6/2016



Site Location Map

New England Power (NEP) d/b/a National Grid
40 Sylvan Road
Waltham, Massachusetts 02451

2 Washington Square, Union Station, Suite 219
Worcester, Massachusetts 01604
508.752.1001 - FAX 508.752.1278

VHB Project No. 12650.00
Merrimack Valley Reliability Project
Issued for: Permitting

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Wetland Delineation Notes:

1. Wetlands were delineated by VHB wetland scientists during the Summer of 2014.
2. Wetland delineation was performed to the standards in the *Corps of Engineers Wetland Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0* (January 2012).
3. Wetlands were GPS-located in the field using a Trimble GeoXT and Trimble GeoXH handheld GPS units with submeter accuracy.
4. Hydric soils were determined in accordance with *Field Indicators for Identifying Hydric Soils in the United States, Version 7.0* published by the Natural Resources Conservation Service, and the *Field Indicators for Identifying Hydric Soils in New England, Version 3.0* published by the New England Interstate Water Pollution Control Commission.
5. Dominance of wetland vegetation was assessed using the *Northcentral and Northeast 2014 Final Regional Wetland Plant List* published by the U.S. Army Corps of Engineers.
6. Wetland were classified using the USFWS methodology *Classification of Wetlands and Deepwater* Habitats of the United States (Cowardin et al. 1979, revised 1985).
7. Wetland function and values were assessed using the *Highway Methodology Workbook Supplement* (USACOE, 1999).

A-1

Merrimack Valley Reliaiblity Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

Source:
National Grid

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THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE

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General Construction Notes:

1. This plan set is provided to show jurisdictional impacts and required environmental controls only. Engineering documents should be consulted to determine the scope and location of all other construction activities. Proposed construction limits of disturbance are approximate. Contractor is responsible for minimizing earth disturbance, as practicable.

2. Erosion and sedimentation control measures shall be installed prior to start of work, shall be maintained, and shall remain in place during construction until all disturbed surfaces are stabilized. Following stabilization, erosion and sedimentation control measures shall be removed off-site and properly disposed.

3. Erosion and sedimentation controls shall be appropriate to the size and nature of the project and to the physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to wetlands or surface waters. The type and installation of sediment and erosion controls shall be in accordance with National Grid's EG303NE (EG-303NE).

4. The environmental controls shown on these plans may need to be supplemented due to season of work, work methods proposed, and additional requirements of outstanding permits.

5. Temporary stone construction entrances will be used at all points of construction ingress/egress from public and private roadways in accordance with EG303NE.

6. The selected contractor is responsible for street sweeping, as required, at points of ingress/egress from public and private roadways in accordance with the NPDES Construction General Permit.

7. Selected contractor will be responsible for certifying that all equipment on the project is clean of invasive species prior to arriving onsite. The contractor will also be responsible for cleaning equipment as it is moved within the project to reduce the risk of spreading invasive plant seeds and fragments.

8. Swamp matting shown on the plans represents the square footage and alignment of matting which is required and has been approved by the regulators. Additional layers of mats may be required at certain locations. Any increase in the number, change in alignment, or decision not to use swamp mats must be approved by an authorized representative of the Permittee(s) and, as appropriate, regulators.

9. Span streams or drainage swales with temporary bridge or swamp mats that are free of soil and debris. Protect all existing culverts encountered along access roads within the ROW.

10. The selected contractor is responsible for installing waterbars and other similar measures to prevent concentrated run-off.

11. The selected contractor is responsible for installing waterbars and other similar measures to prevent concentrated run-off.

12. Any excavated material shall be placed outside of jurisdictional areas or removed from the site.

13. If dewatering is required, dewatering basins shall be placed in uplands areas and discharge water into upland areas.

14. Areas of soil disturbance shall be stabilized following construction in accordance with EG-303NE.

A-2

Merrimack Valley Reliaiblity Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

Source:
National Grid, Eversource

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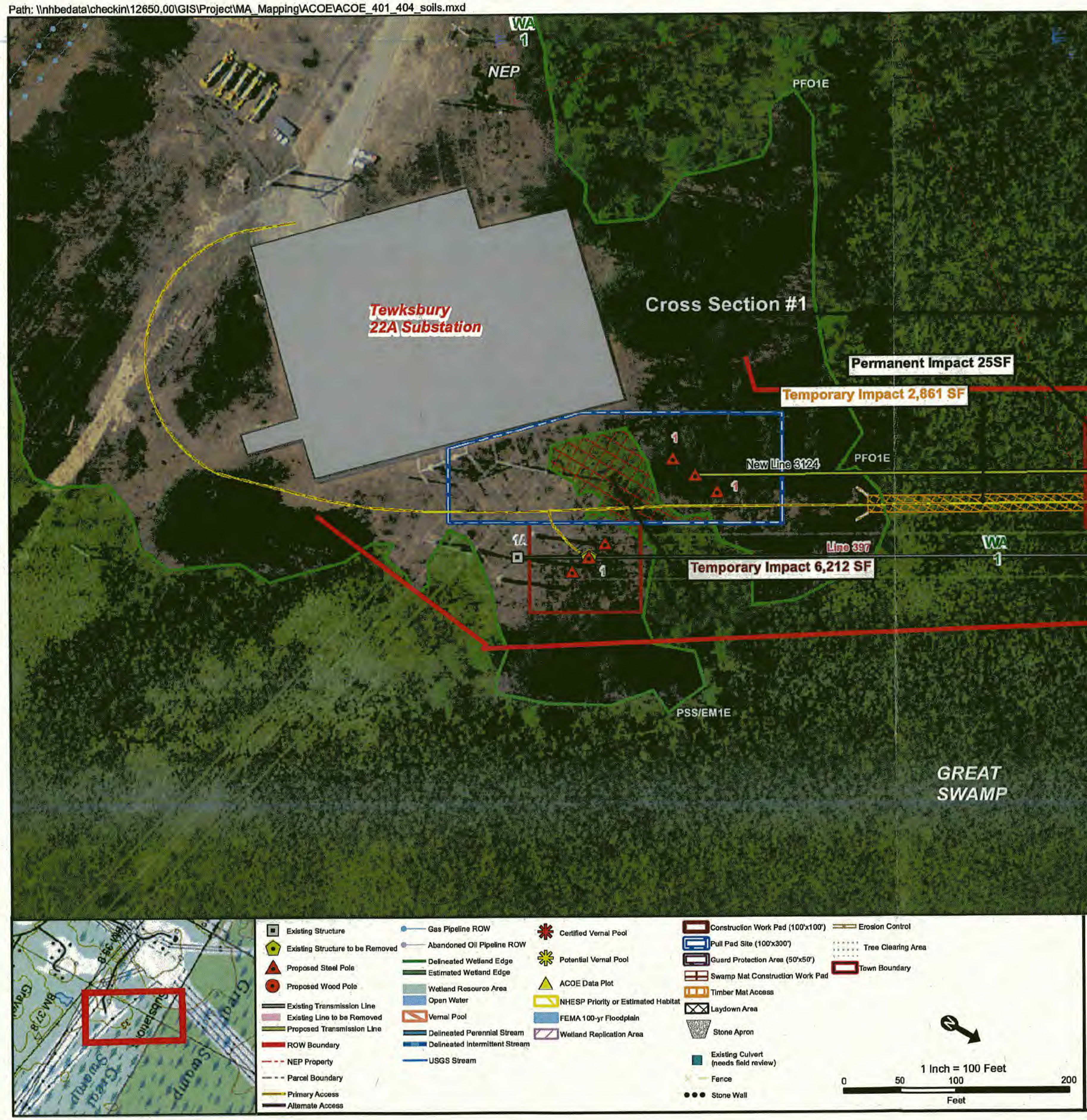

Merrimack Valley Reliability Project

Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

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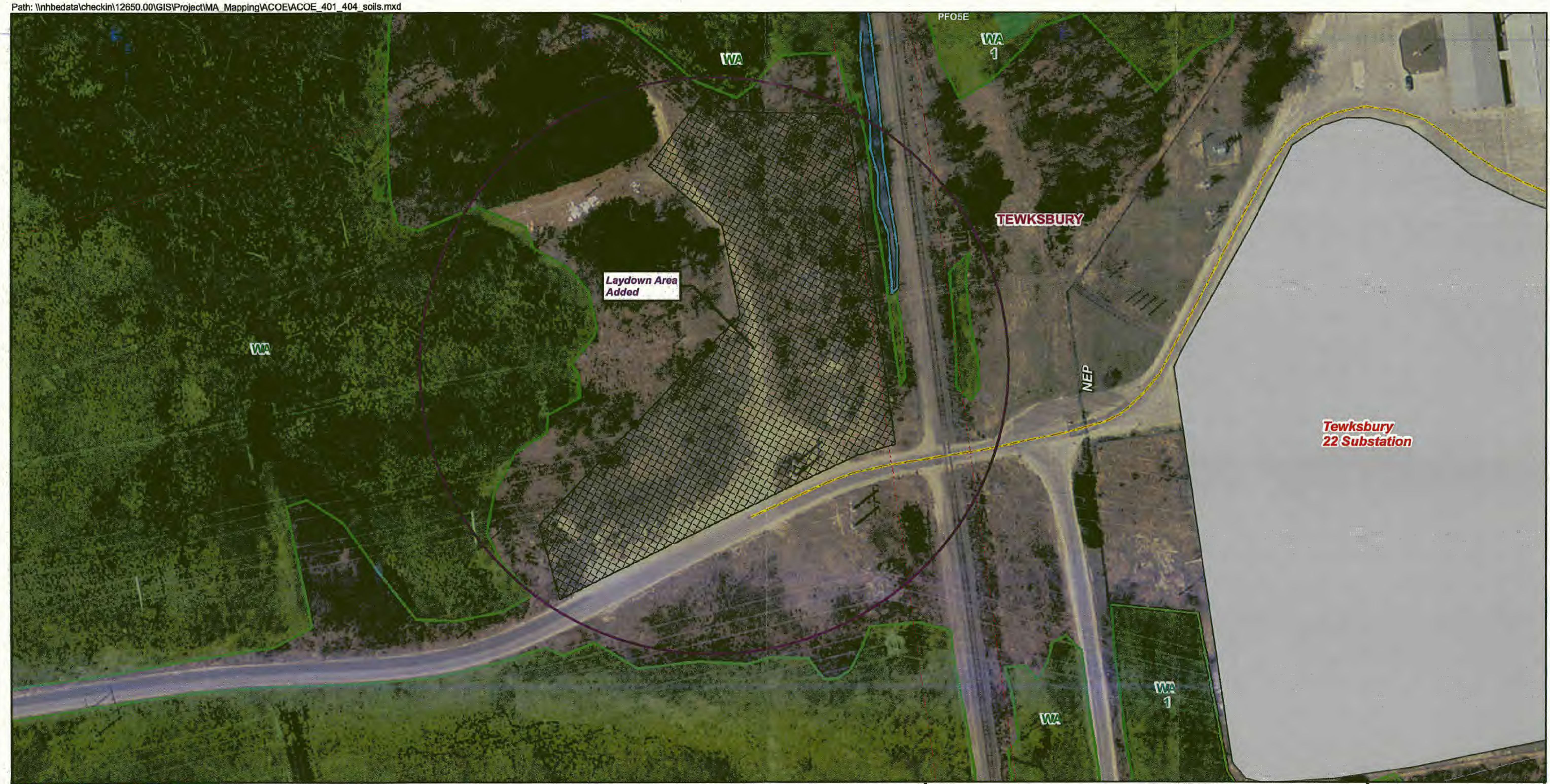

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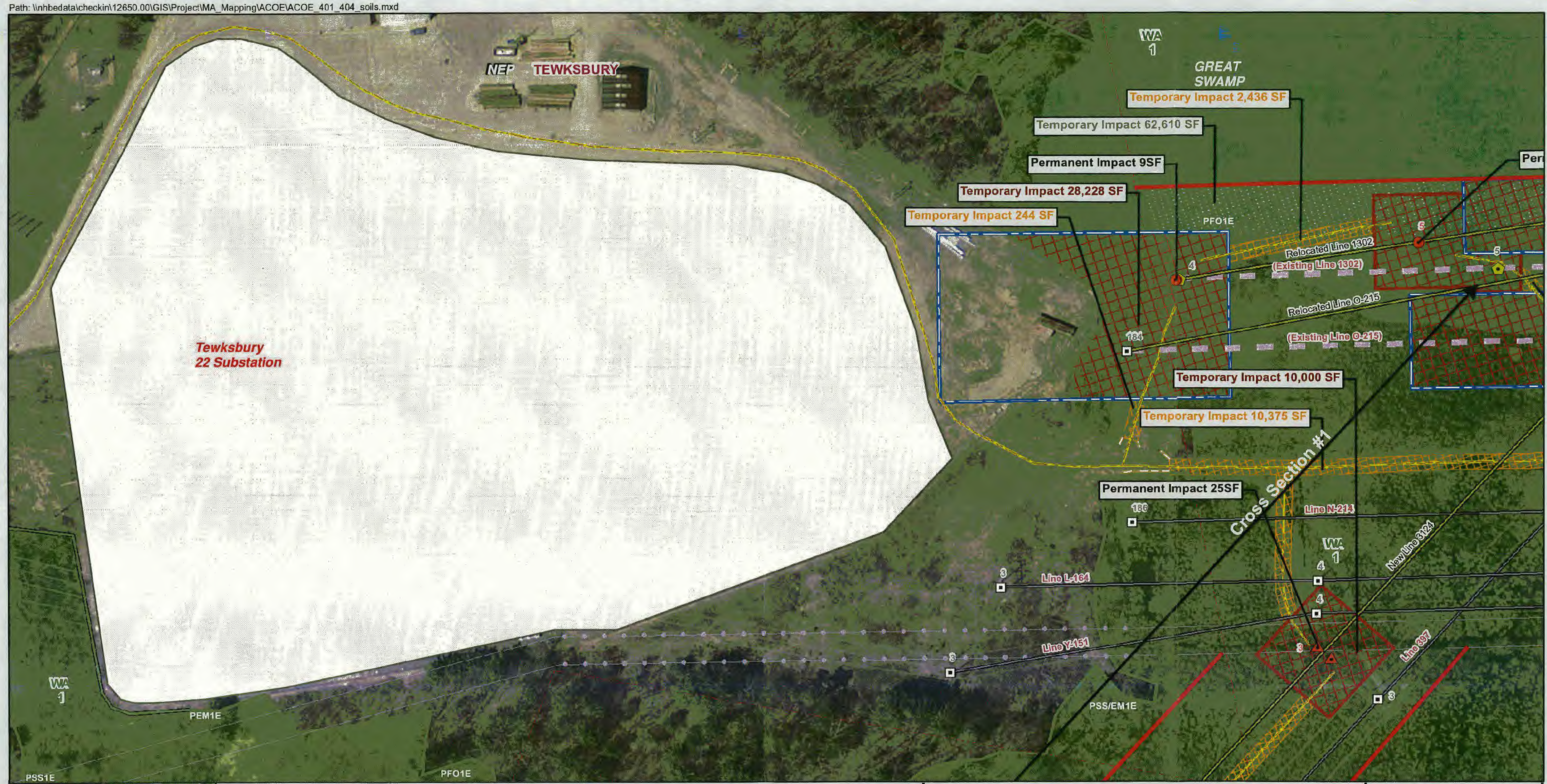

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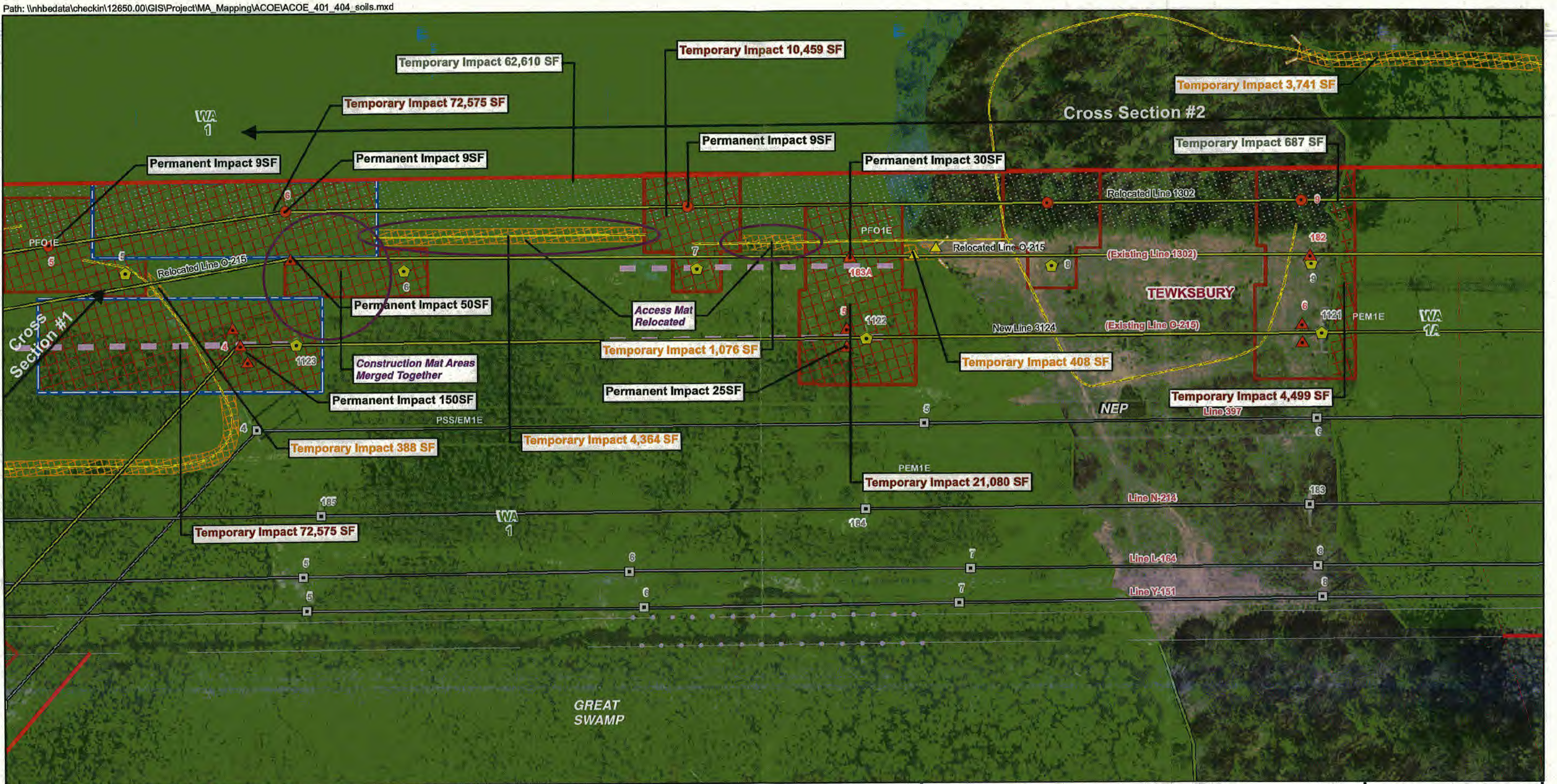

- Existing Structure
- Existing Structure to be Removed
- Proposed Steel Pole
- Proposed Wood Pole
- Existing Transmission Line
- Existing Line to be Removed
- Proposed Transmission Line
- ROW Boundary
- NEP Property
- Parcel Boundary
- Primary Access
- Alternate Access
- Gas Pipeline ROW
- Abandoned Oil Pipeline ROW
- Delineated Wetland Edge
- Estimated Wetland Edge
- Wetland Resource Area
- Open Water
- Vernal Pool
- Delineated Perennial Stream
- Delineated Intermittent Stream
- USGS Stream
- Certified Vernal Pool
- Potential Vernal Pool
- ACOE Data Plot
- NHESP Priority or Estimated Habitat
- FEMA 100-yr Floodplain
- Wetland Replication Area
- Construction Work Pad (100'x100')
- Pull Pad Site (100'x300')
- Guard Protection Area (50'x50')
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- Timber Mat Access
- Laydown Area
- Stone Apron
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- Tree Clearing Area
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N

1 Inch = 100 Feet

0 50 100 200
Feet

Merrimack Valley Reliability Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN
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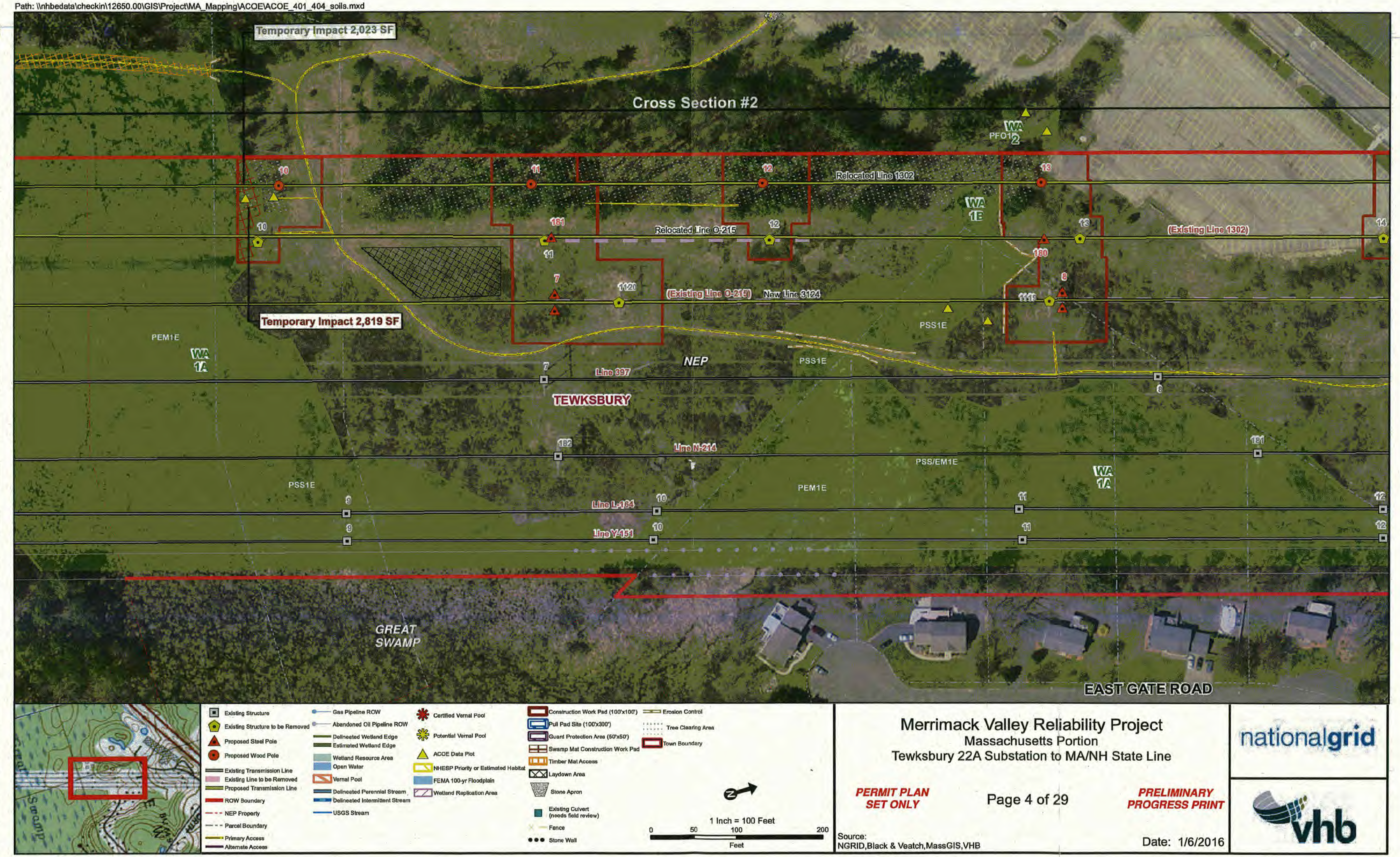

Merrimack Valley Reliability Project

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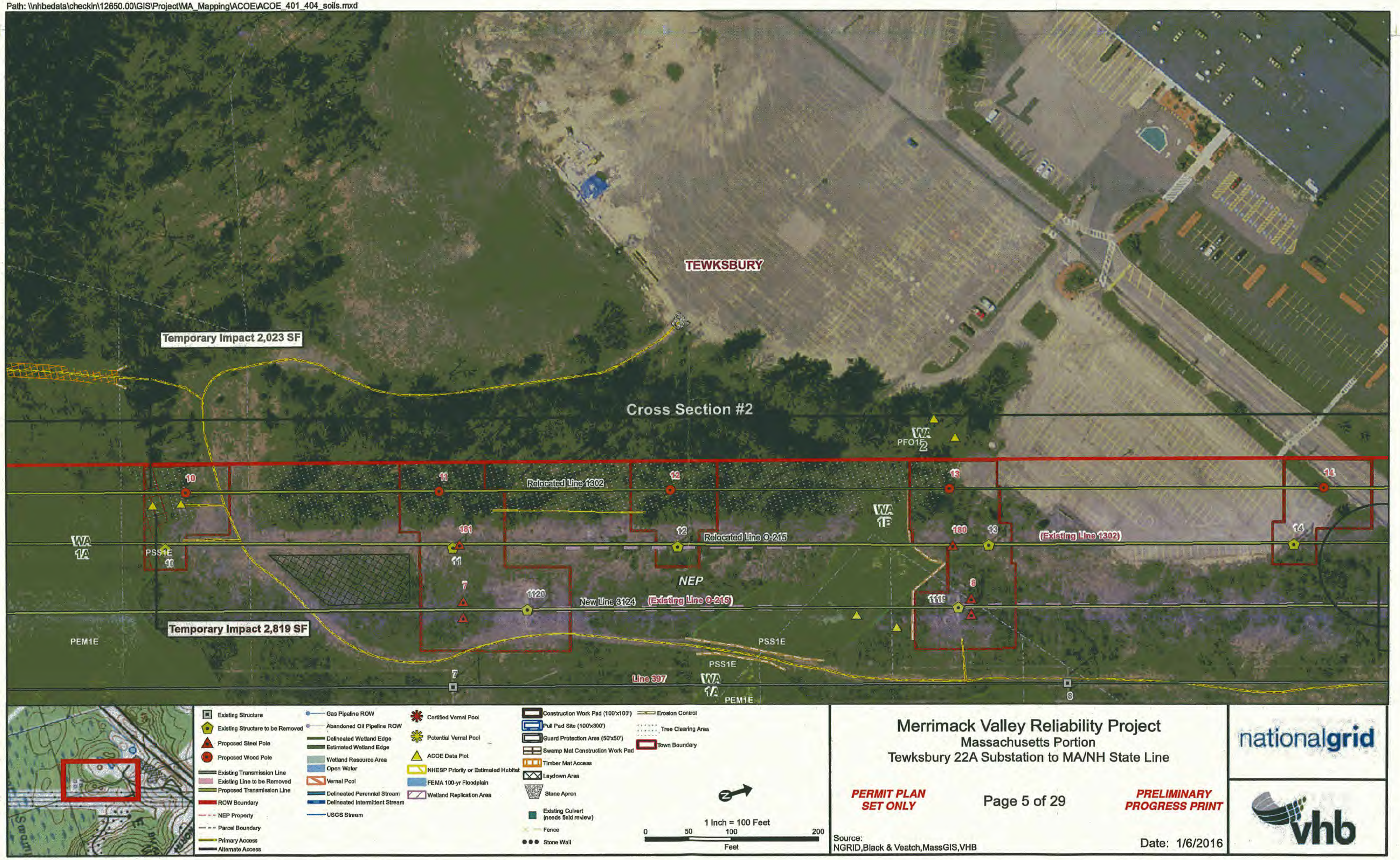

Merrimack Valley Reliability Project
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Tewksbury 22A Substation to MA/NH State Line

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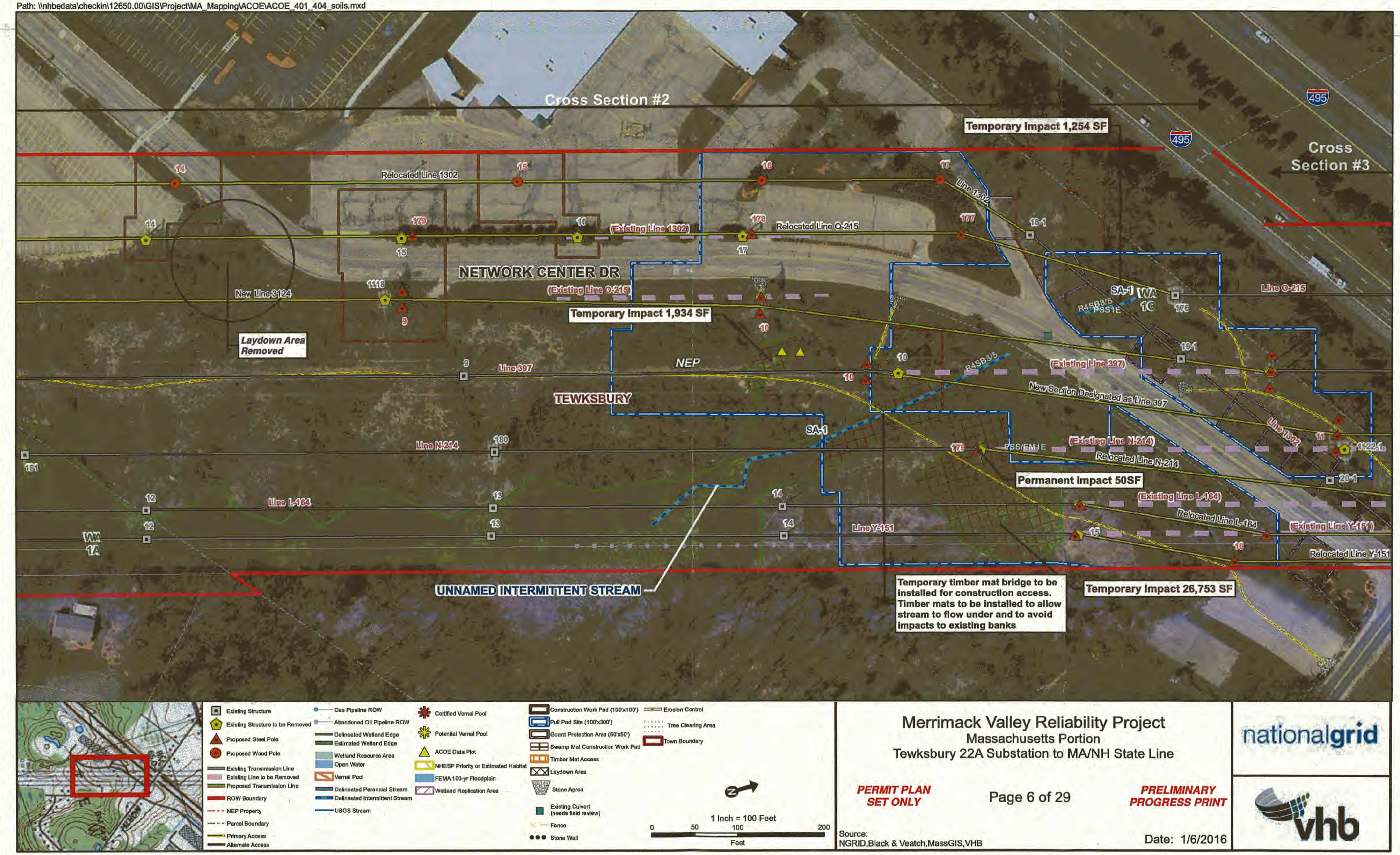

Merrimack Valley Reliability Project

Massachusetts Portion
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PERMIT PLAN SET ONLY

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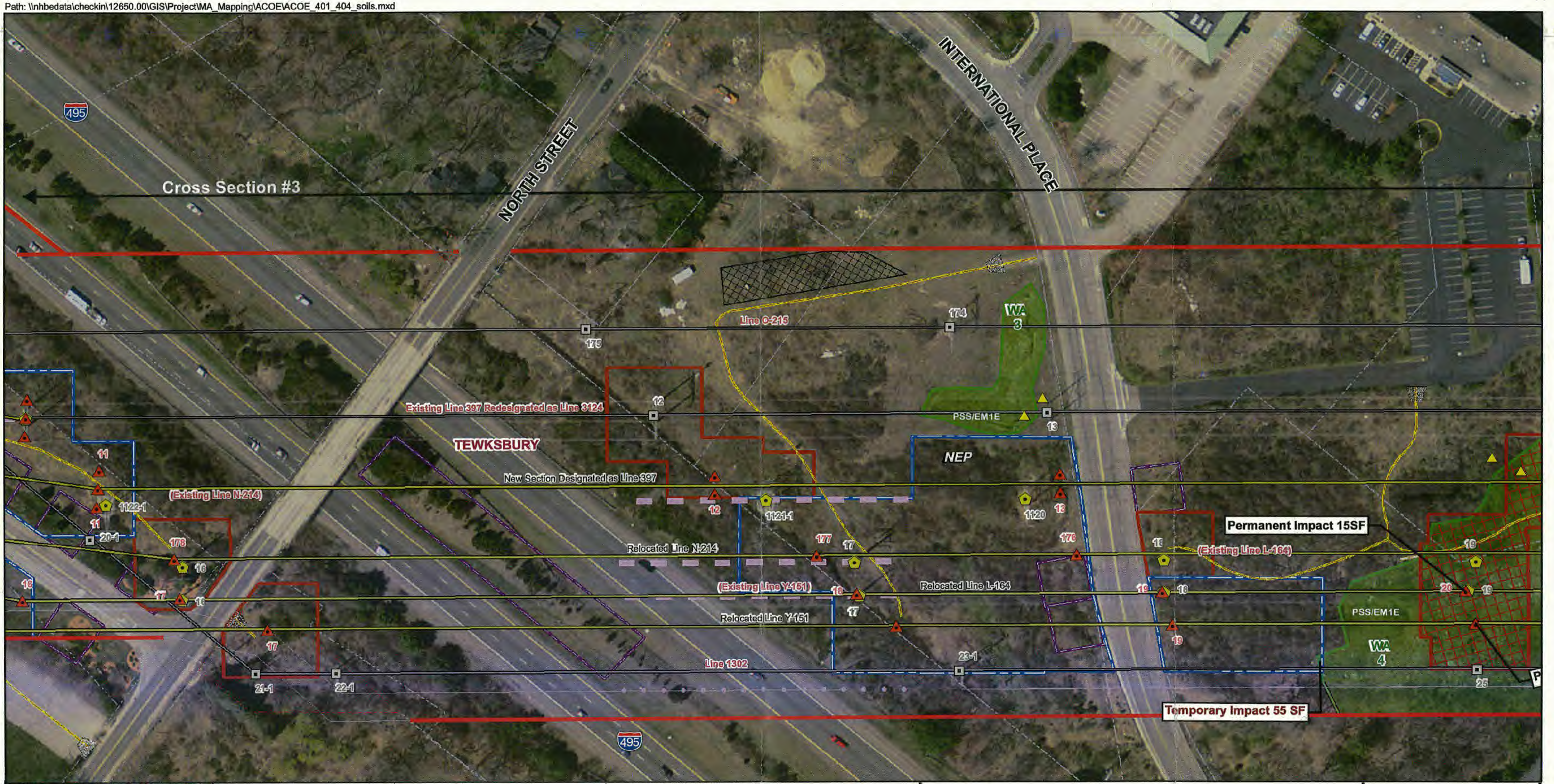

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Merrimack Valley Reliability Project

Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

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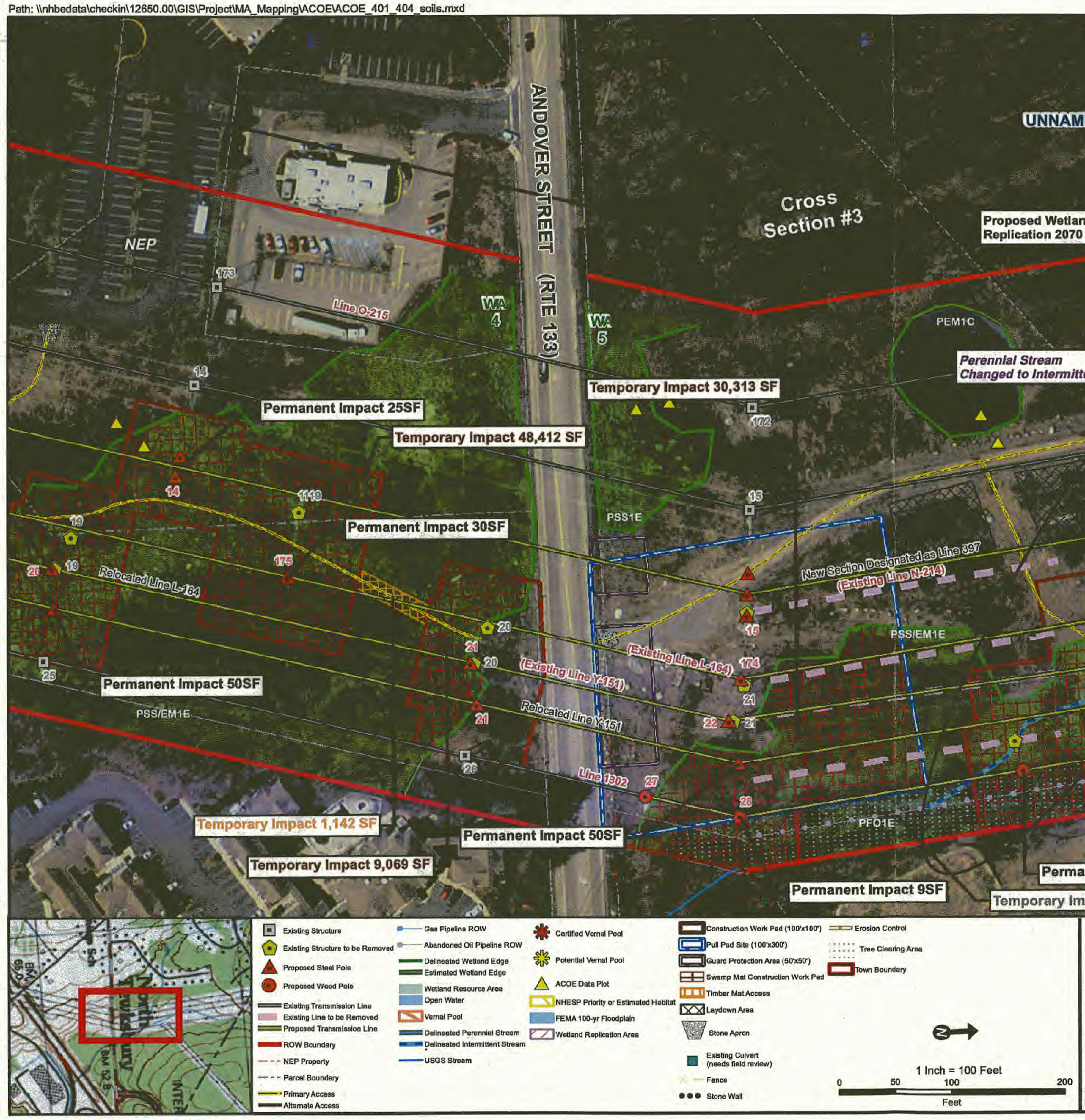

Merrimack Valley Reliability Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

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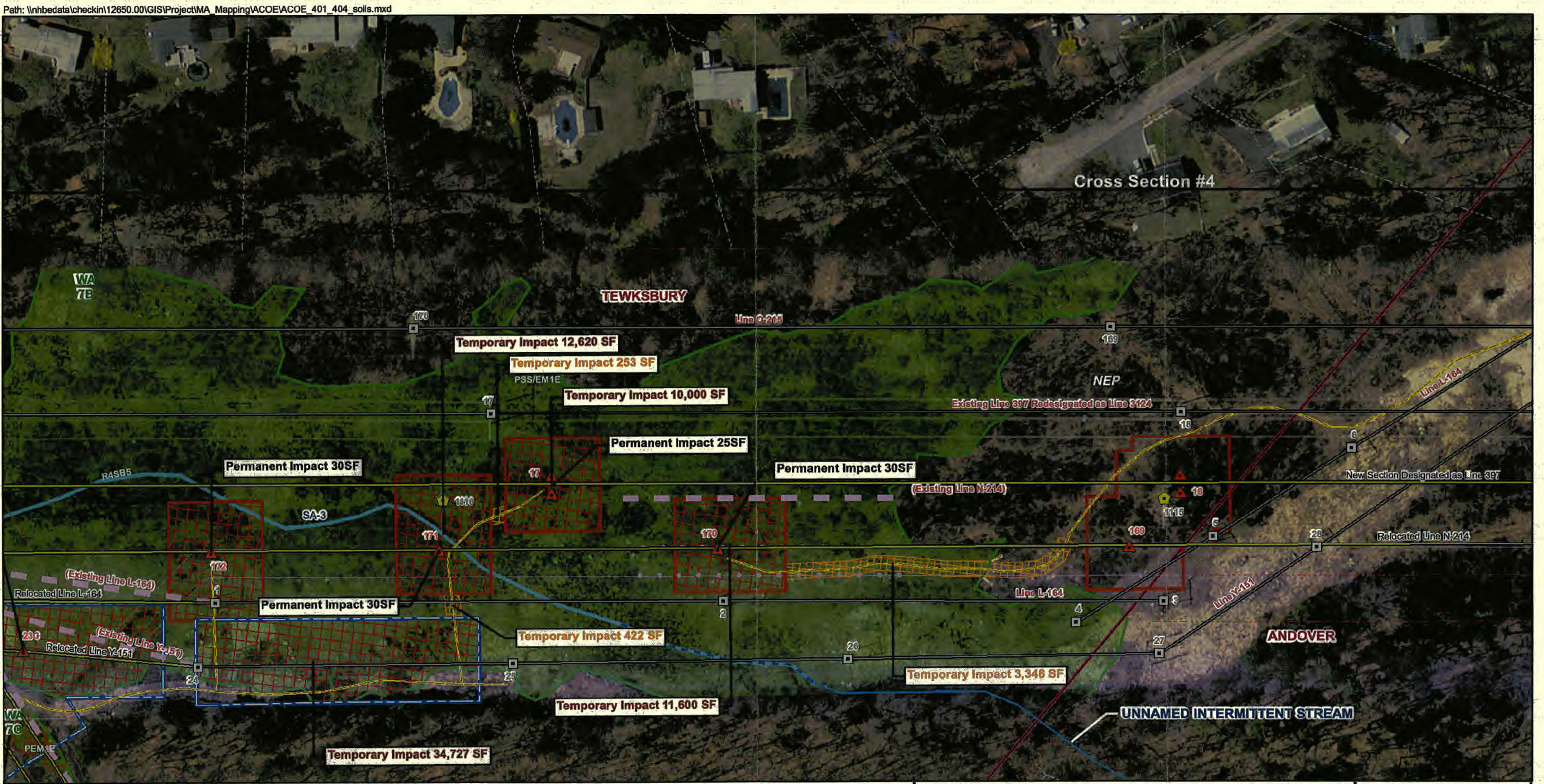

Merrimack Valley Reliability Project

Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

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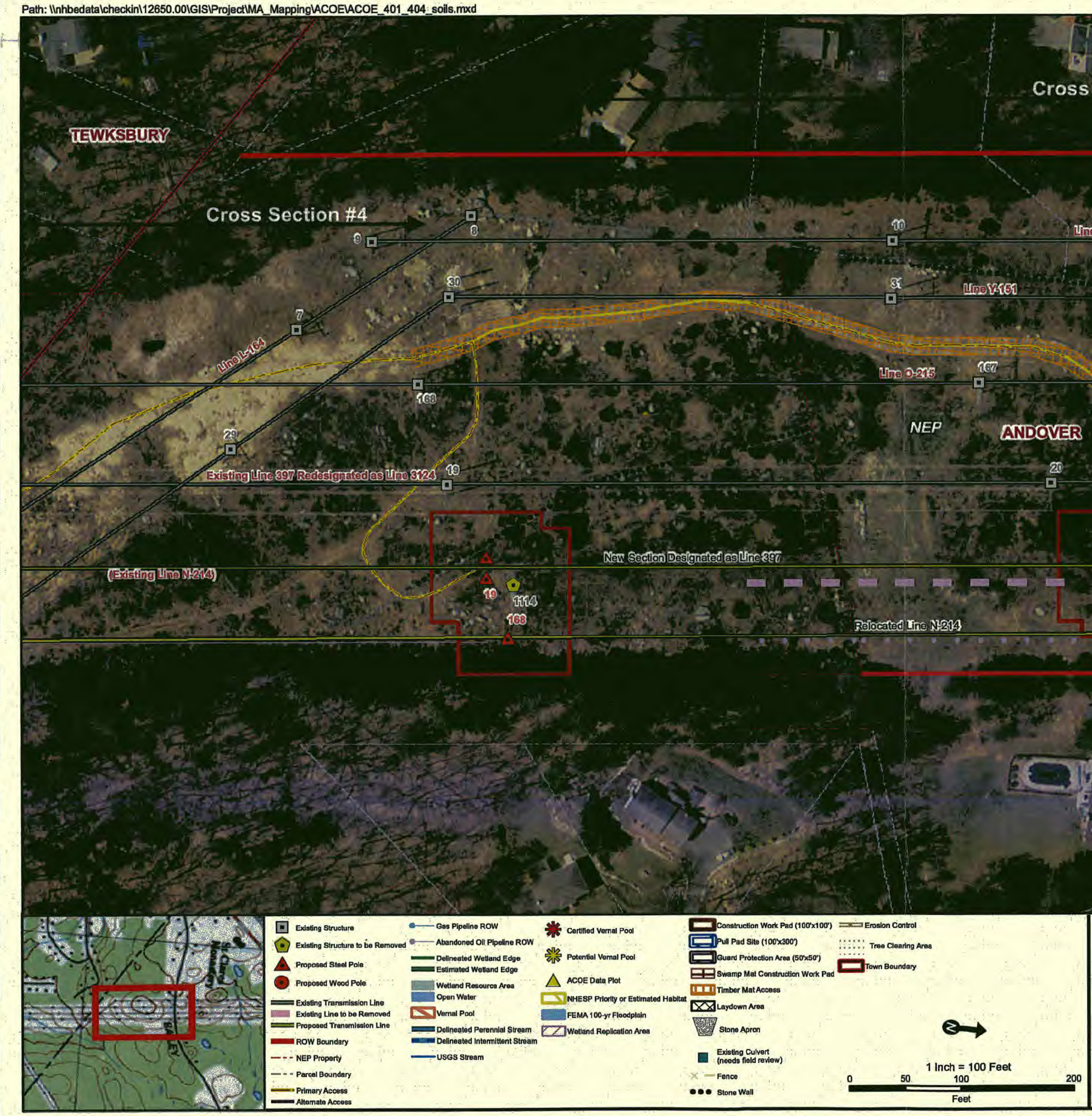

Merrimack Valley Reliability Project

Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

Page 10 of 29

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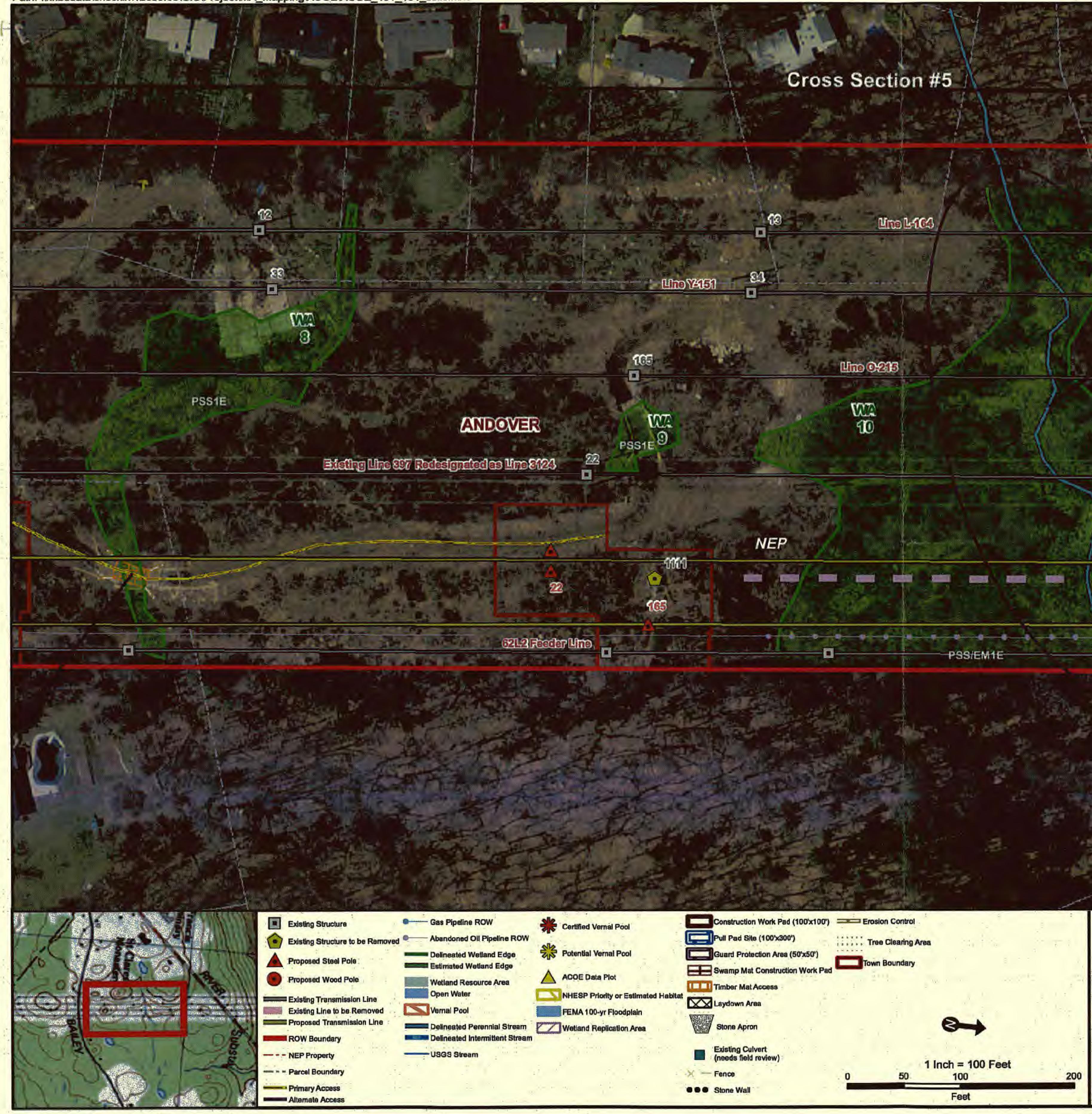

Merrimack Valley Reliability Project

Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

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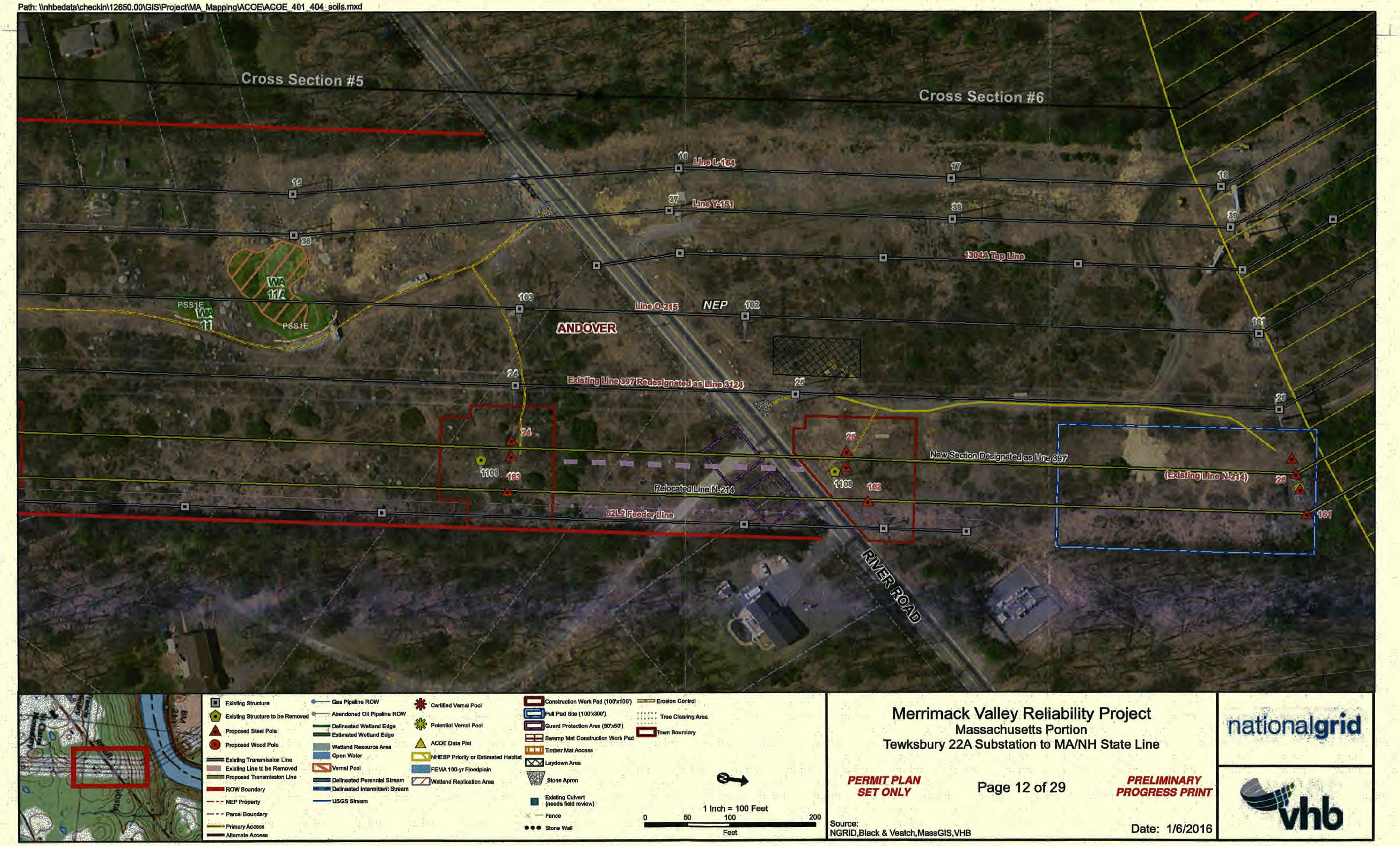

Merrimack Valley Reliability Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

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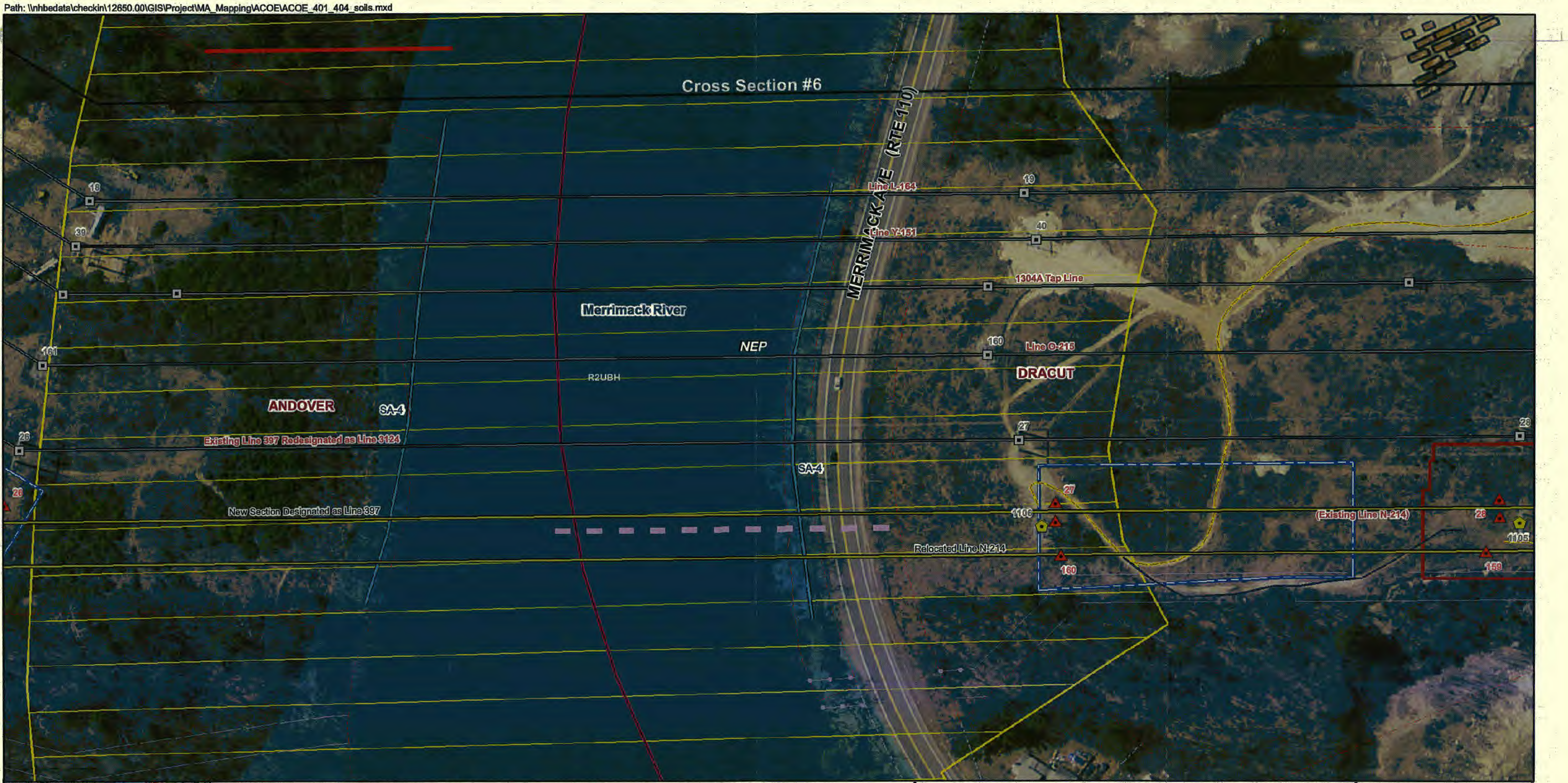

- ▣ Existing Structure
- ⬟ Existing Structure to be Removed
- ▲ Proposed Steel Pole
- ● Proposed Wood Pole
- Existing Transmission Line
- Existing Line to be Removed
- Proposed Transmission Line
- ROW Boundary
- NEP Property
- Parcel Boundary
- Primary Access
- Alternate Access
- Gas Pipeline ROW
- Abandoned Oil Pipeline ROW
- Delineated Wetland Edge
- Estimated Wetland Edge
- Wetland Resource Area
- Open Water
- Vernal Pool
- Delineated Perennial Stream
- Delineated Intermittent Stream
- USGS Stream
- Certified Vernal Pool
- Potential Vernal Pool
- ▲ ACOE Data Plot
- NHESP Priority or Estimated Habitat
- FEMA 100-yr Floodplain
- Wetland Replication Area
- Construction Work Pad (100'x100')
- Pull Pad Site (100'x300')
- Guard Protection Area (50'x50')
- Swamp Mat Construction Work Pad
- Timber Mat Access
- Laydown Area
- Stone Apron
- Existing Culvert (needs field review)
- Fence
- ●●● Stone Wall
- Erosion Control
- Tree Clearing Area
- Town Boundary

N

1 Inch = 100 Feet

0 50 100 200

Feet

Merrimack Valley Reliability Project
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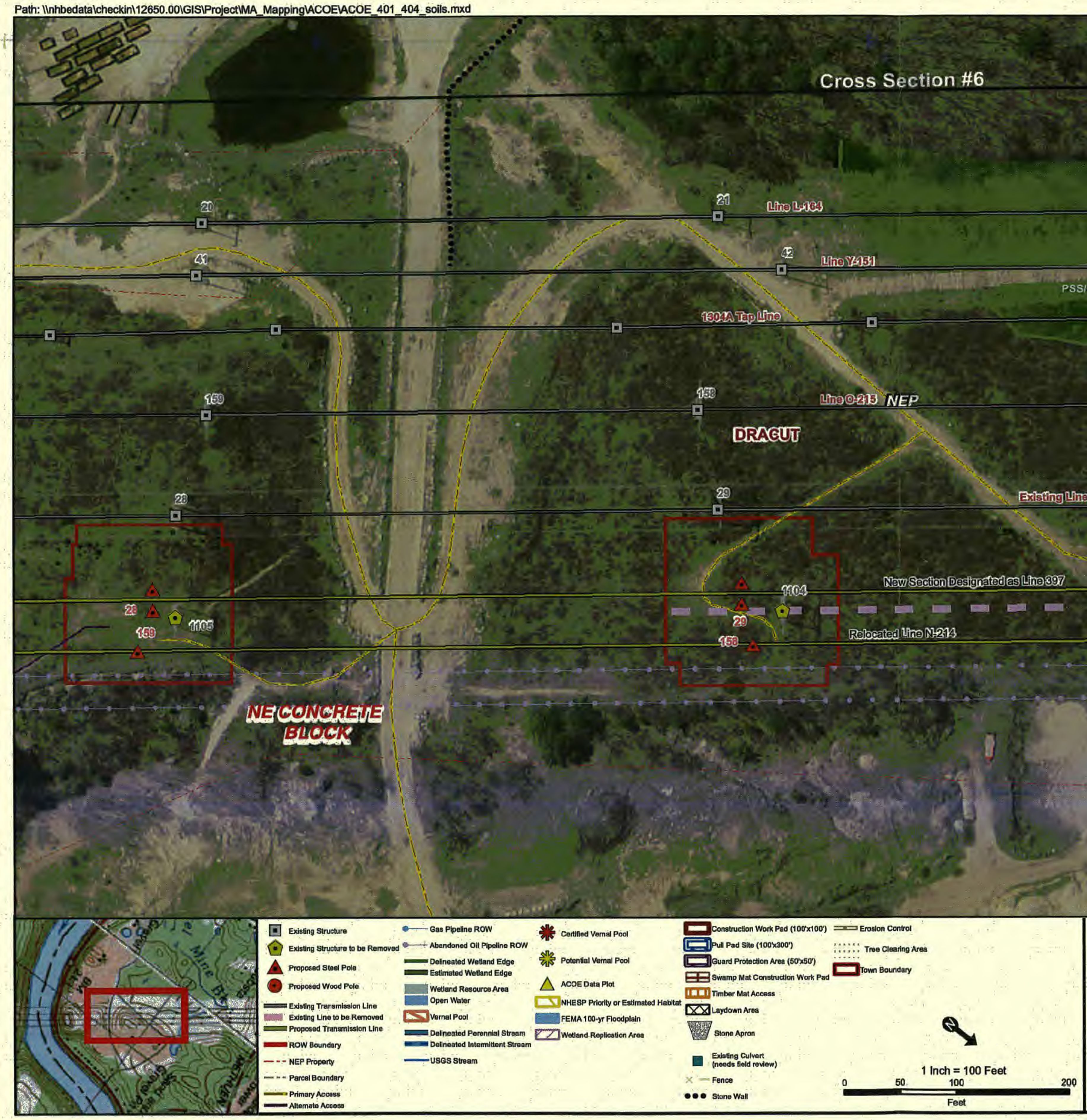
Cross Section #6
Line L-164
Line Y-151
1304A Tap Line
Line O-215
NEP
DRACUT
PSS/EM1E
WA 13
Temporary timber mat bridge to be installed for construction access. Timber mats to be installed to allow stream to flow under and to avoid impacts to existing banks
Temporary Impact 8,963 SF
Temporary Impact 1,080 SF
Existing Line 397 Redesignated as Line 3124
New Section Designated as Line 397
(Existing Line N-214)
Relocated Line N-214
NE CONCRETE BLOCK
UNNAMED INTERMITTENT STREAM
SA-5
R4SB5
PFO1E
20
21
22
41
42
43
159
158
157
28
29
30
1105
1104
1103
Existing Structure
Existing Structure to be Removed
Proposed Steel Pole
Proposed Wood Pole
Existing Transmission Line
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0
50
100
200
Feet

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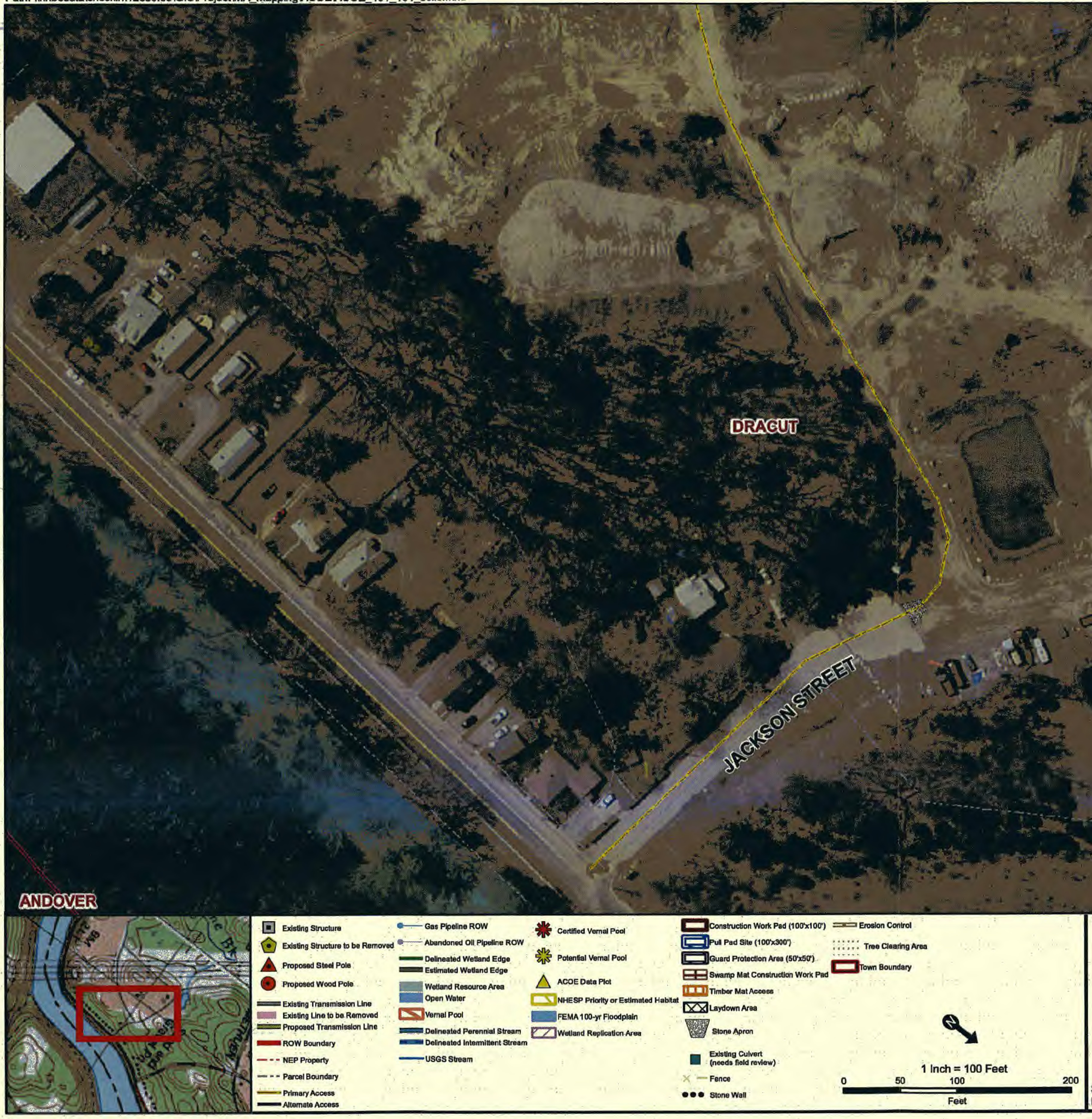

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Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

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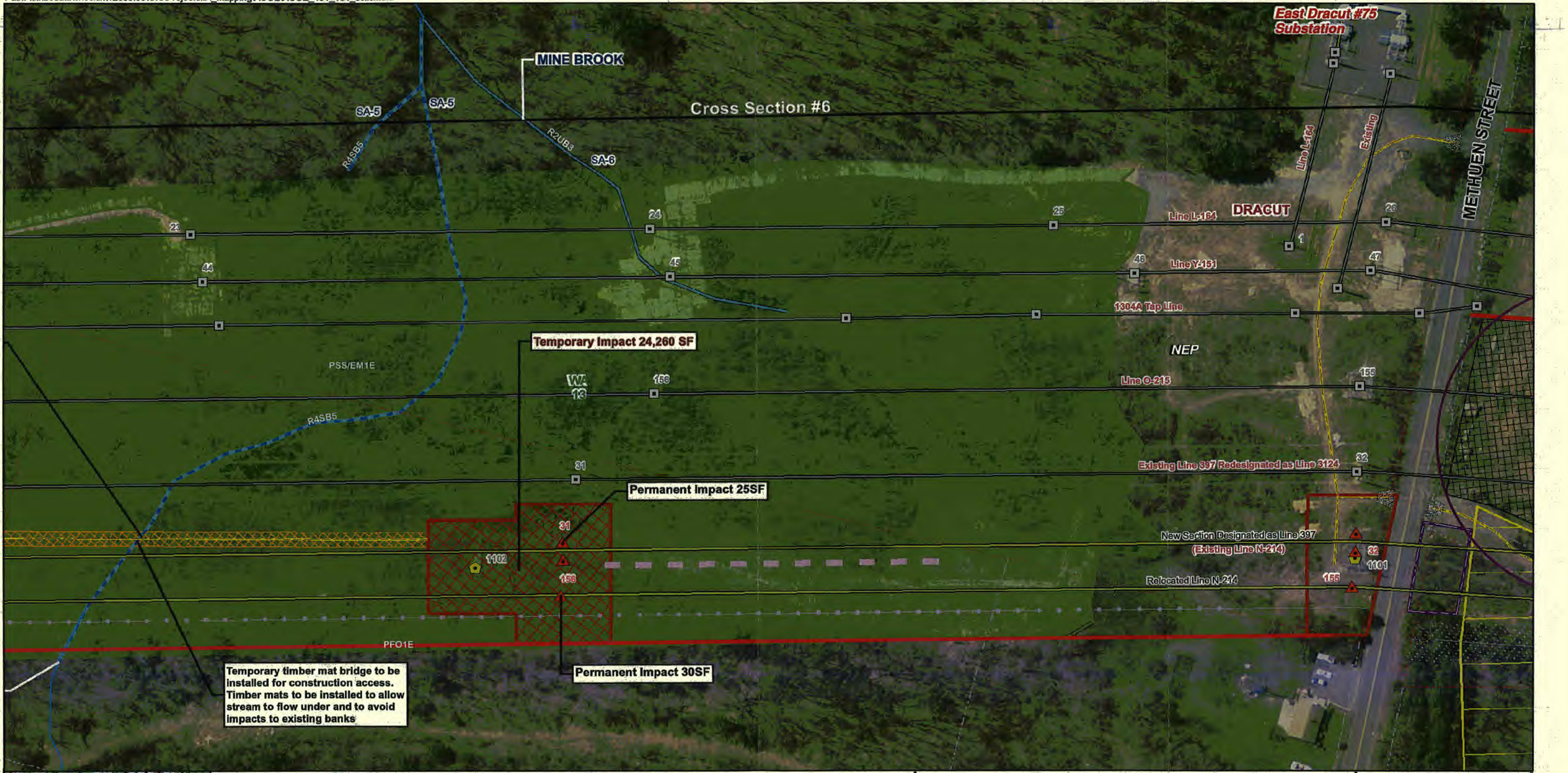

Temporary Impact 24,260 SF

Permanent Impact 25SF

Permanent Impact 30SF

Temporary timber mat bridge to be installed for construction access. Timber mats to be installed to allow stream to flow under and to avoid impacts to existing banks

- ▣ Existing Structure
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- ▲ Proposed Steel Pole
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1 Inch = 100 Feet

0 50 100 200

Feet

Merrimack Valley Reliability Project

Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

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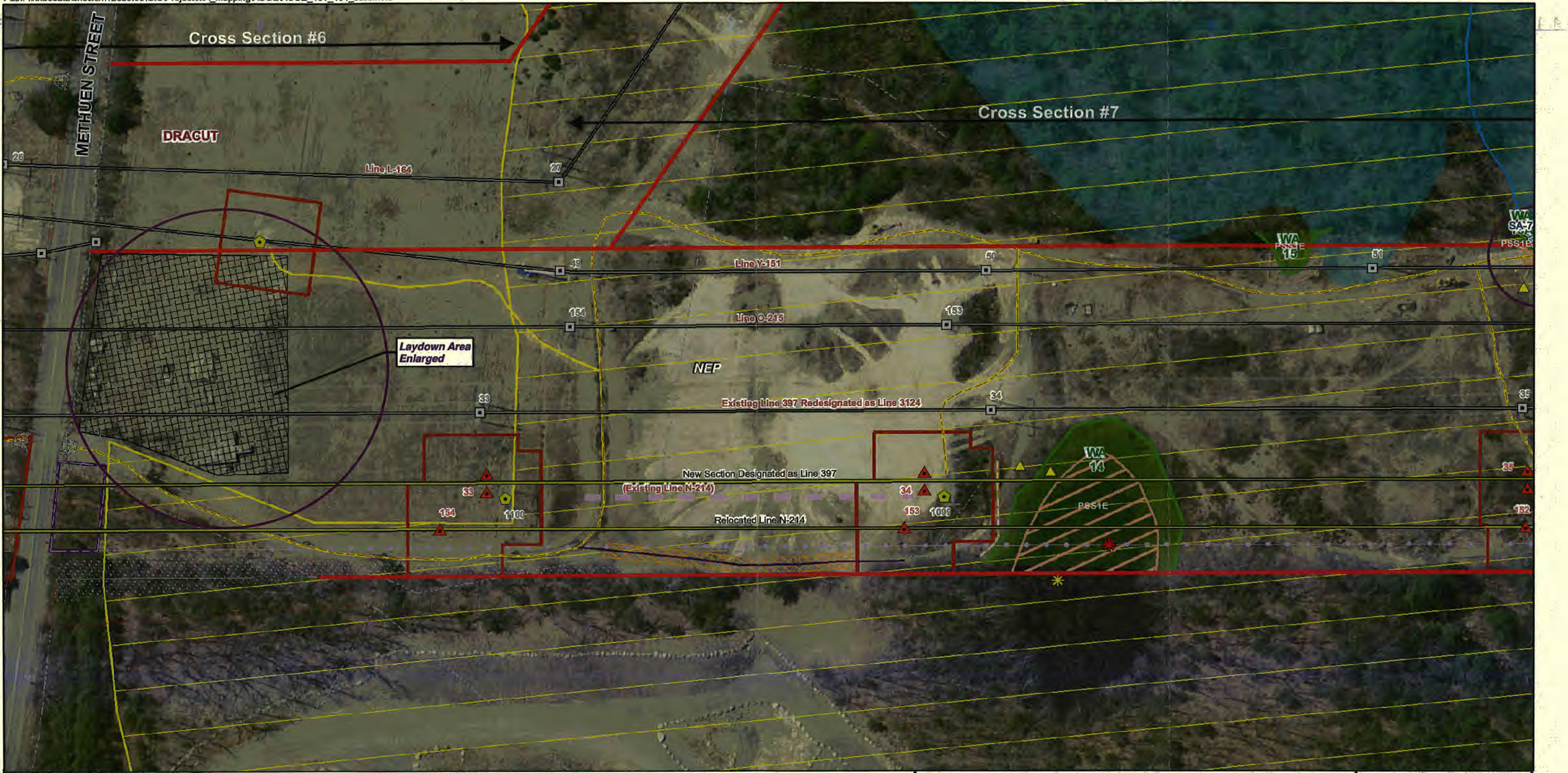

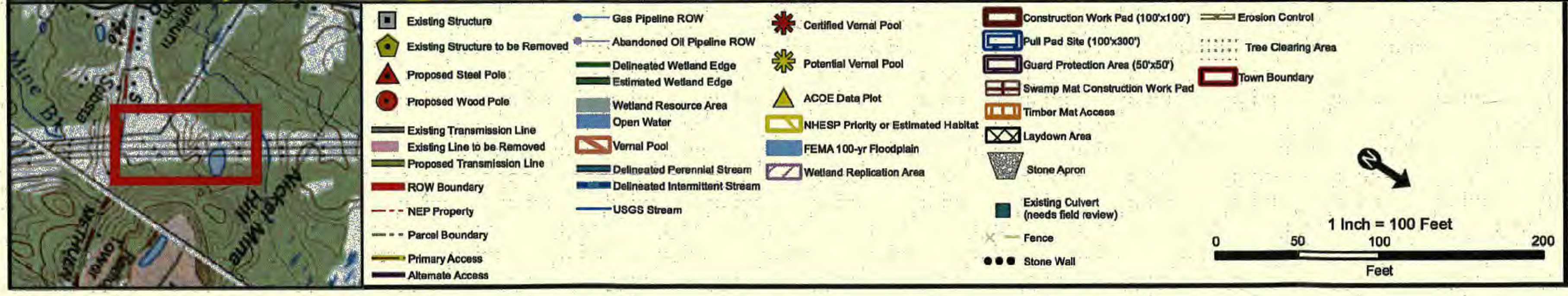

Merrimack Valley Reliability Project

Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

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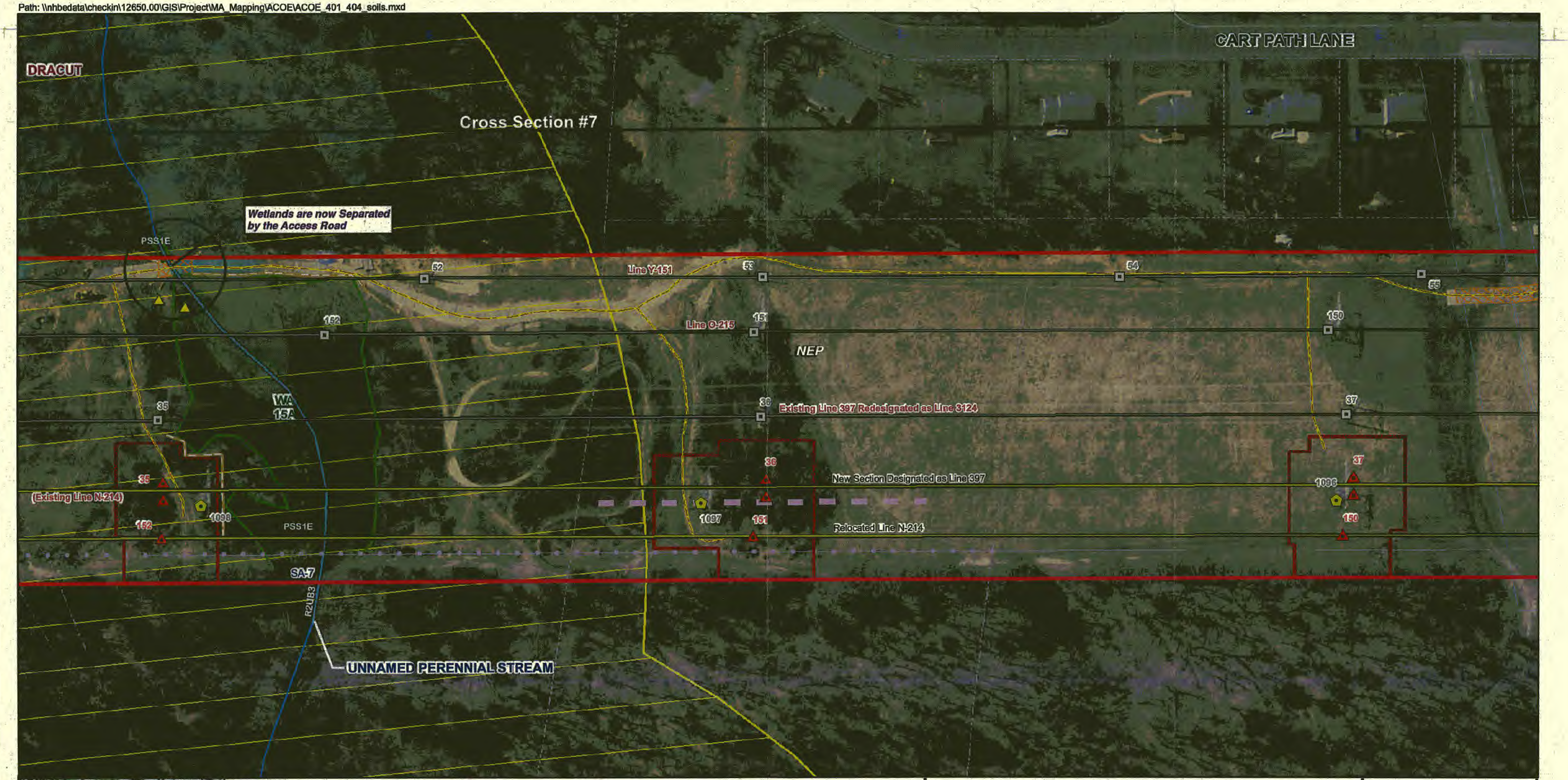

Merrimack Valley Reliability Project

Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

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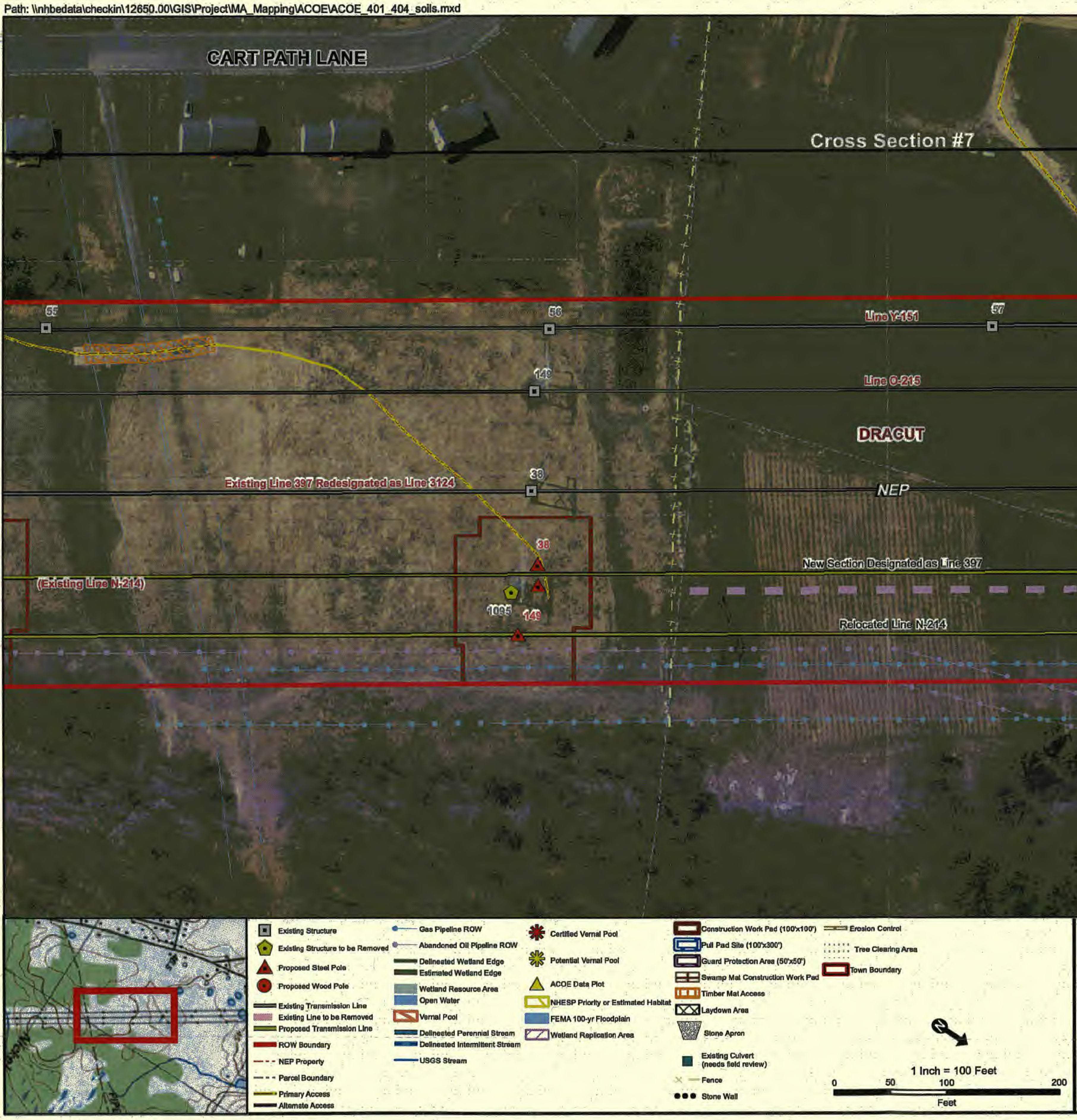

Merrimack Valley Reliability Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

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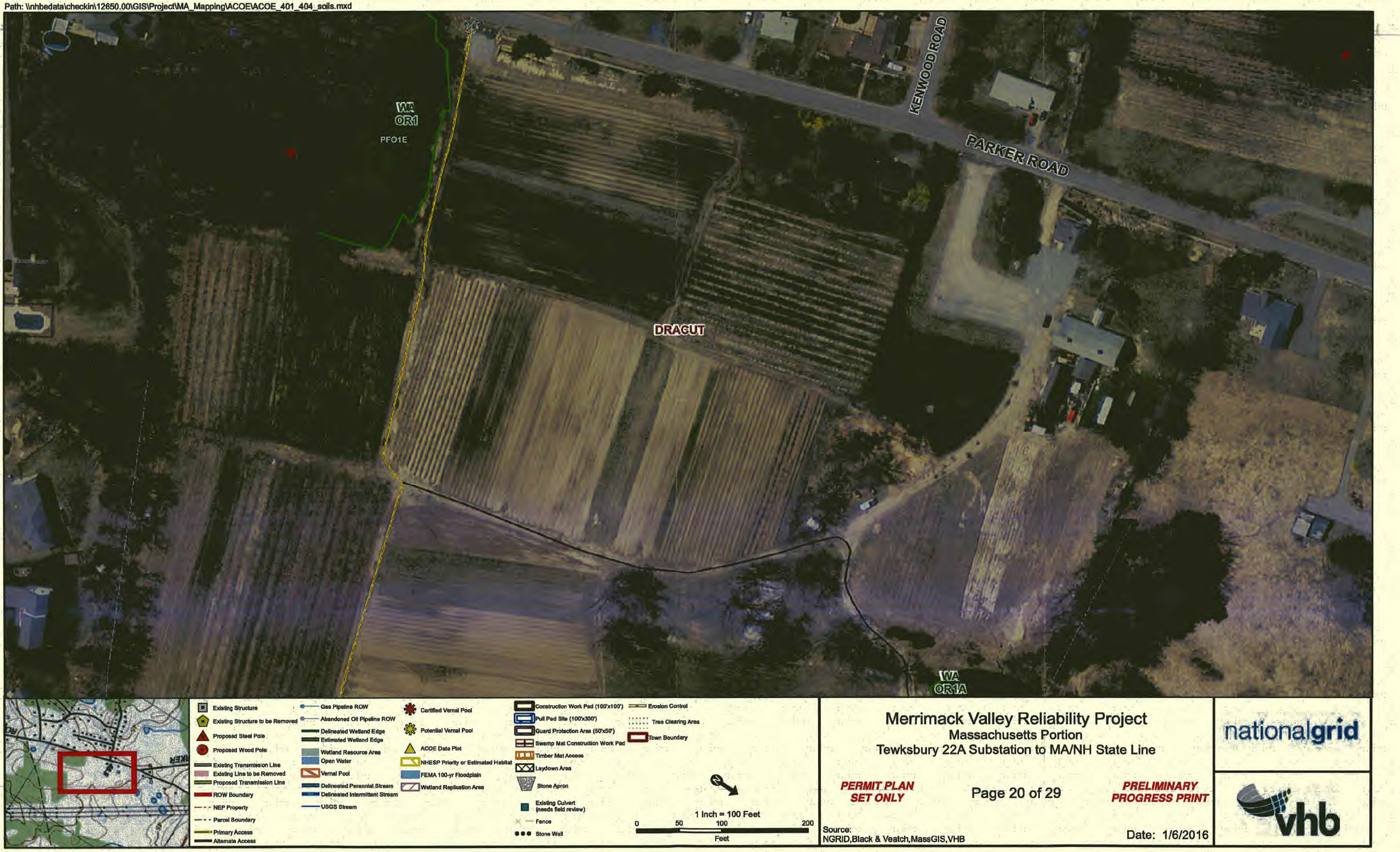

Merrimack Valley Reliability Project

Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

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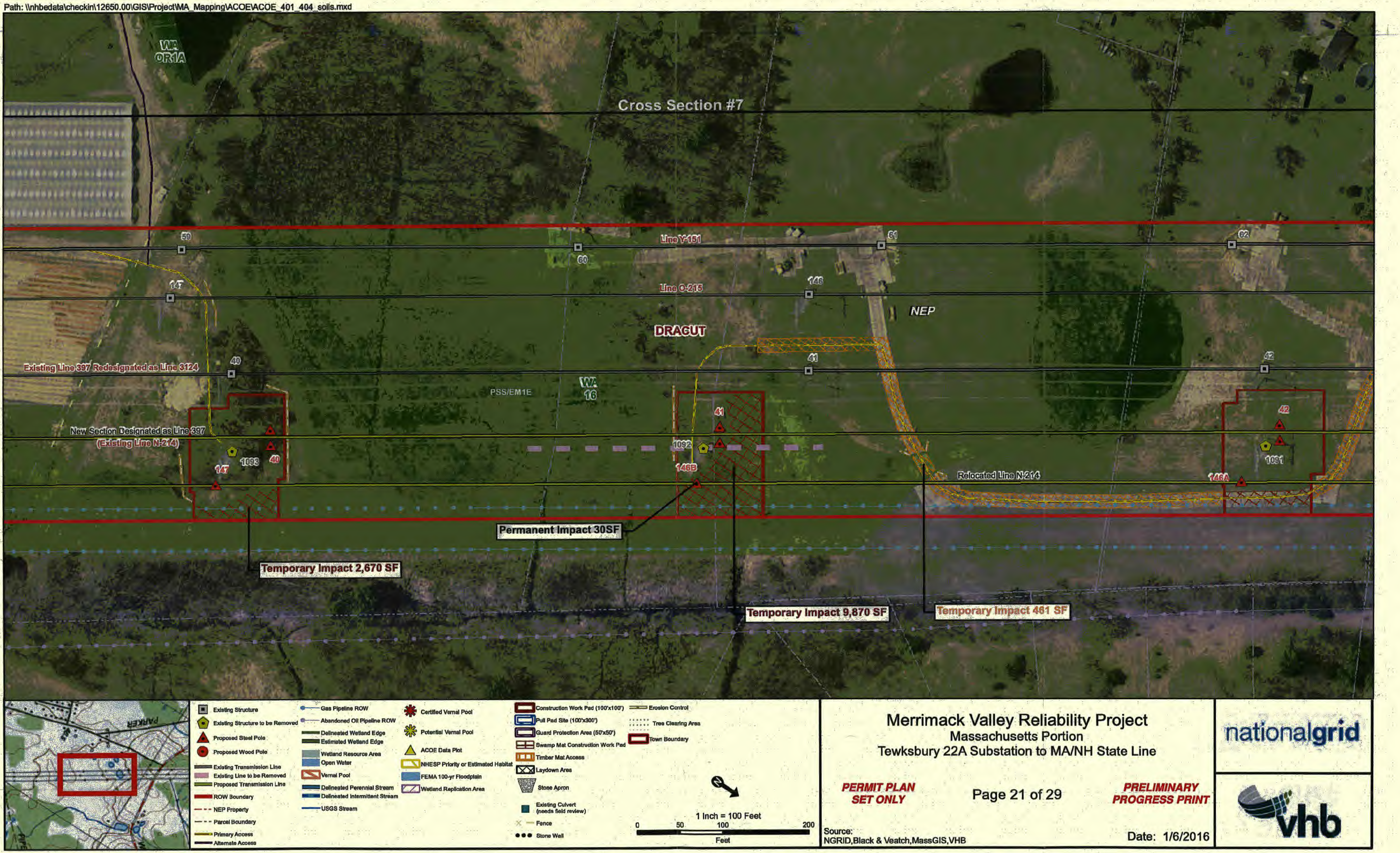

Merrimack Valley Reliability Project

Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

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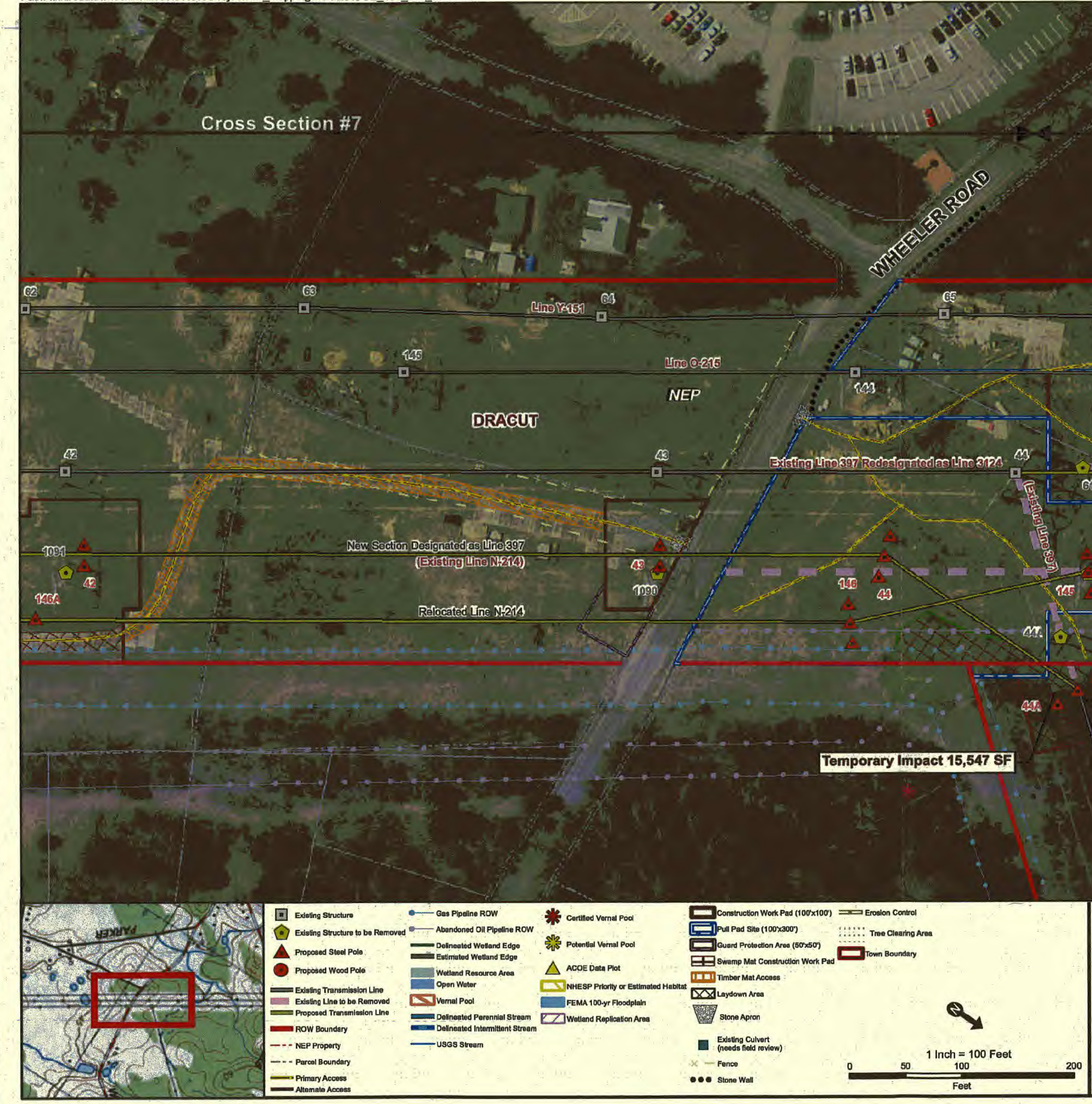

Source:
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Merrimack Valley Reliability Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

PERMIT PLAN SET ONLY

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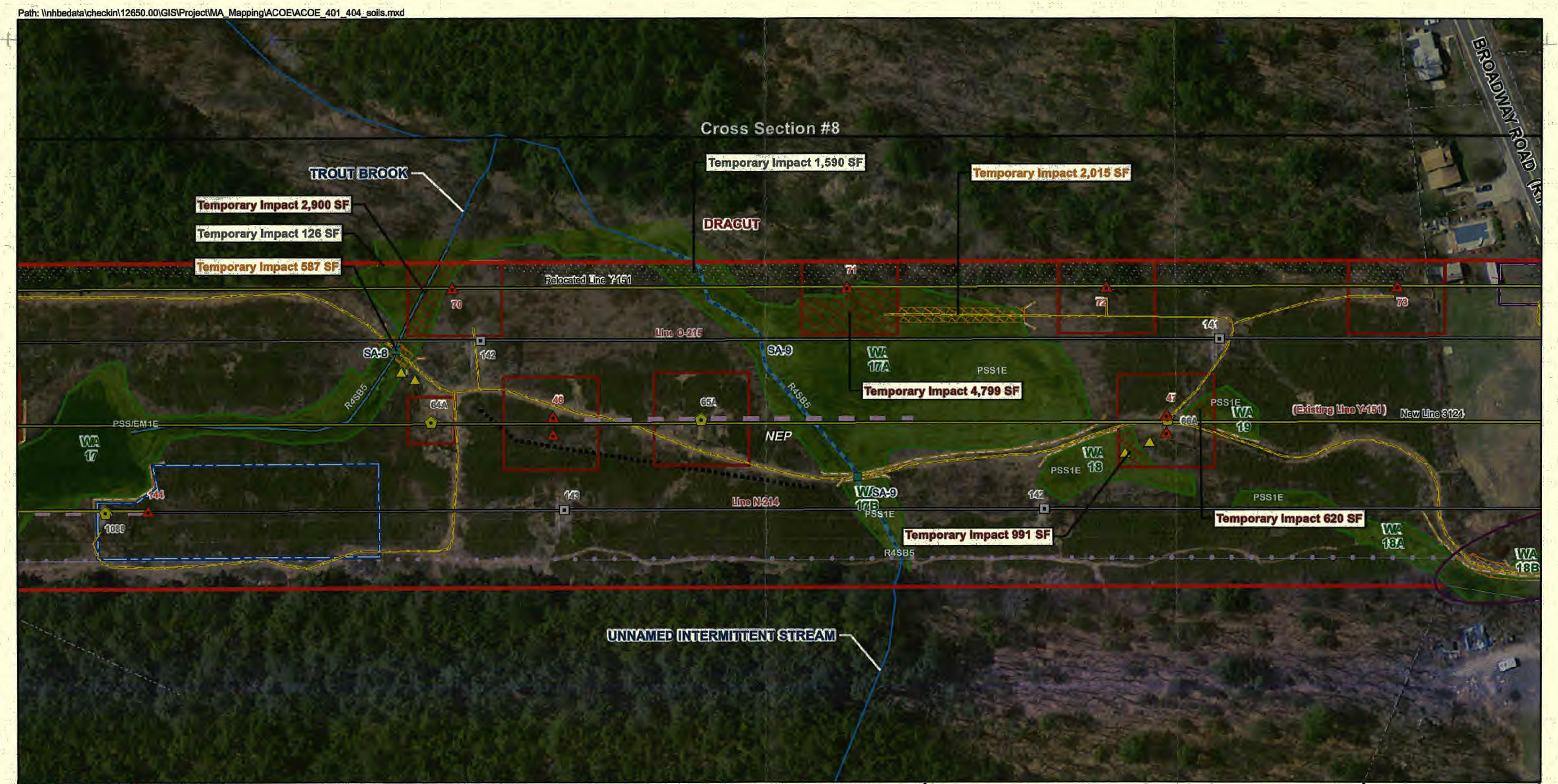

Merrimack Valley Reliability Project
Massachusetts Portion
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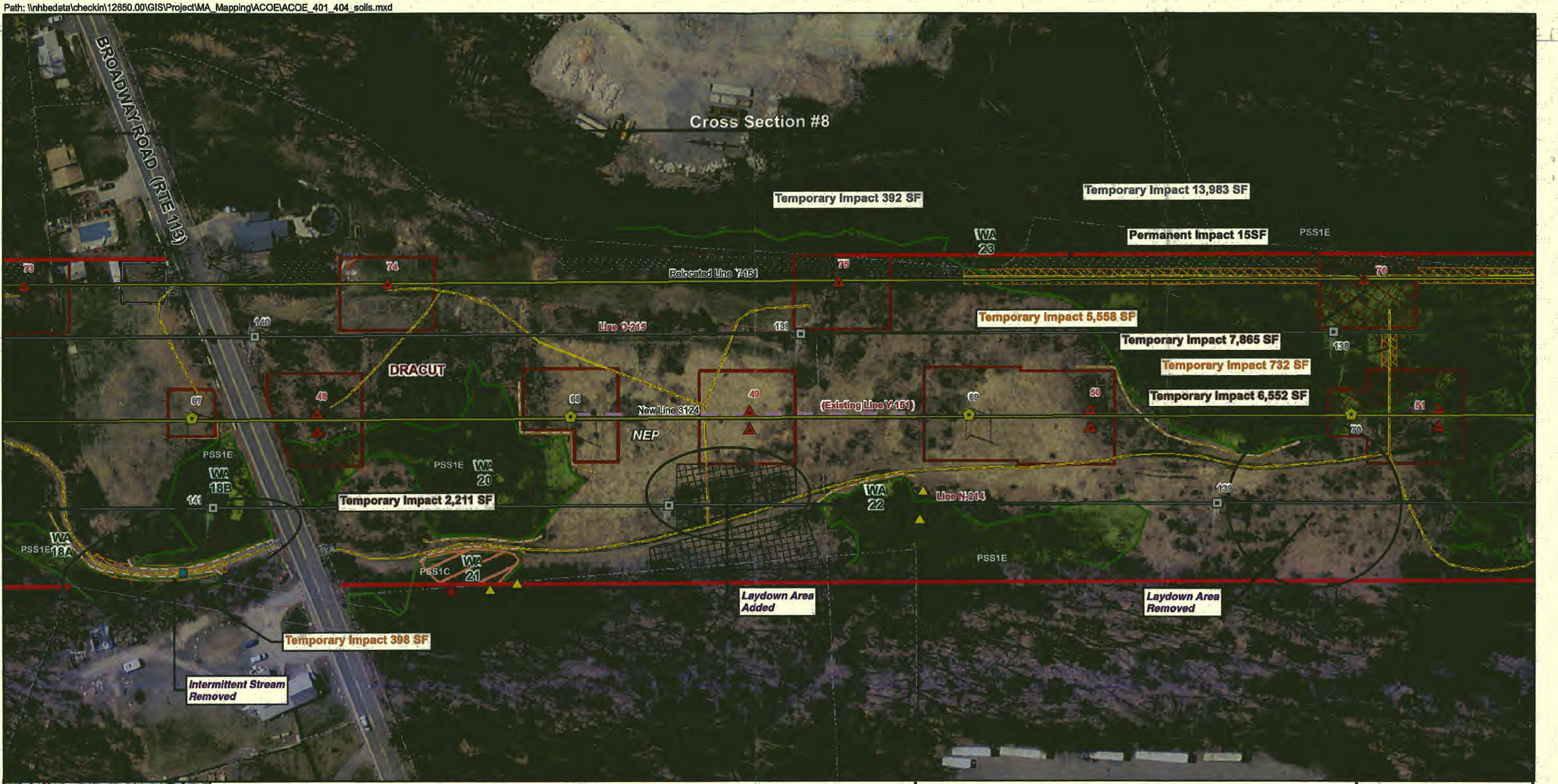

Existing Structure
Existing Structure to be Removed
Proposed Steel Pole
Proposed Wood Pole
Existing Transmission Line
Existing Line to be Removed
Proposed Transmission Line
ROW Boundary
NEP Property
Parcel Boundary
Primary Access
Alternate Access
Gas Pipeline ROW
Abandoned Oil Pipeline ROW
Delineated Wetland Edge
Estimated Wetland Edge
Wetland Resource Area
Open Water
Vernal Pool
Delineated Perennial Stream
Delineated Intermittent Stream
USGS Stream
Certified Vernal Pool
Potential Vernal Pool
ACOE Data Plot
NHESP Priority or Estimated Habitat
FEMA 100-yr Floodplain
Wetland Replication Area
Construction Work Pad (100'x100')
Pull Pad Site (100'x300')
Guard Protection Area (50'x50')
Swamp Mat Construction Work Pad
Timber Mat Access
Laydown Area
Stone Apron
Existing Culvert (needs field review)
Fence
Stone Wall
Erosion Control
Tree Clearing Area
Town Boundary

1 Inch = 100 Feet
0 50 100 200
Feet

Merrimack Valley Reliability Project
Massachusetts Portion
Tewksbury 22A Substation to MA/NH State Line

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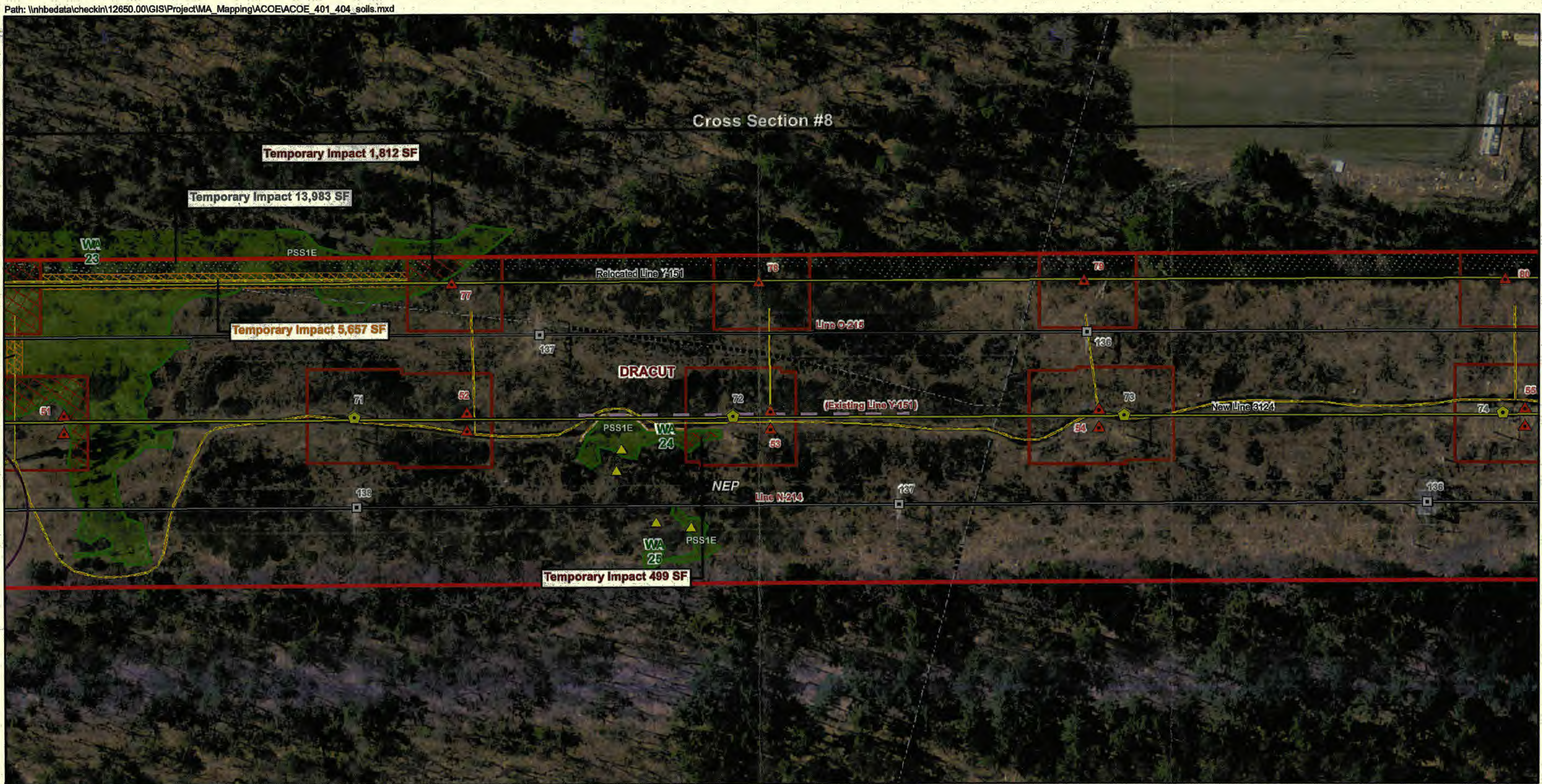

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- Erosion Control
- Tree Clearing Area
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0 50 100 200

Feet

Merrimack Valley Reliability Project

Massachusetts Portion

Tewksbury 22A Substation to MA/NH State Line

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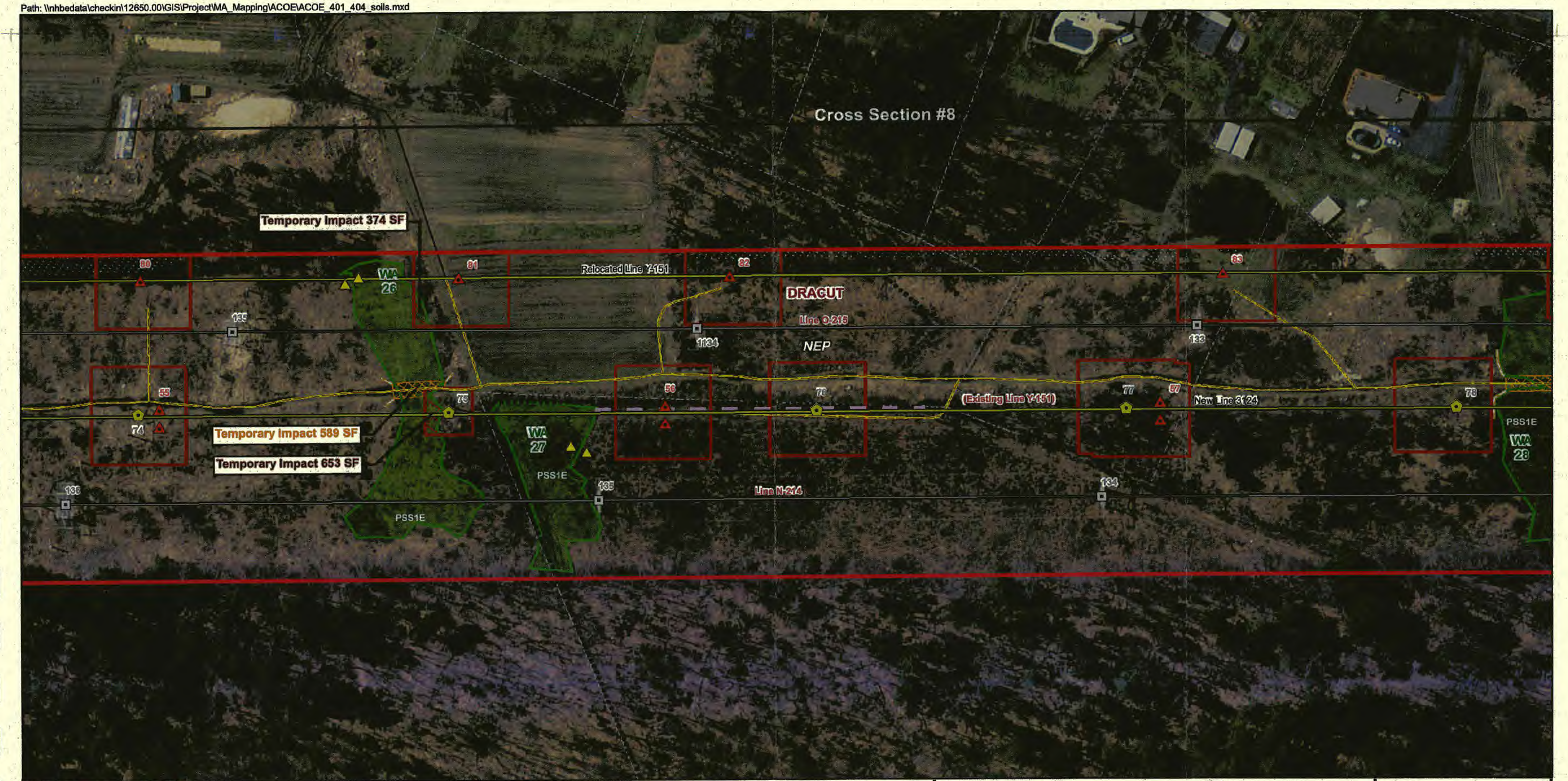

▣ Existing Structure	Gas Pipeline ROW	Certified Vernal Pool	Construction Work Pad (100'x100')
Existing Structure to be Removed	Abandoned Oil Pipeline ROW	Potential Vernal Pool	Pull Pad Site (100'x300')
▲ Proposed Steel Pole	Delineated Wetland Edge	▲ ACOE Data Plot	Guard Protection Area (50'x50')
● Proposed Wood Pole	Estimated Wetland Edge	NHESP Priority or Estimated Habitat	Swamp Mat Construction Work Pad
Existing Transmission Line	Wetland Resource Area	FEMA 100-yr Floodplain	Timber Mat Access
Existing Line to be Removed	Open Water	Wetland Replication Area	Laydown Area
Proposed Transmission Line	Vernal Pool		Stone Apron
ROW Boundary	Delineated Perennial Stream		Existing Culvert (needs field review)
NEP Property	Delineated Intermittent Stream		Fence
Parcel Boundary	USGS Stream		●●● Stone Wall
Primary Access			Erosion Control
Alternate Access			Tree Clearing Area
			Town Boundary

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0 50 100 200

Feet

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Massachusetts Portion
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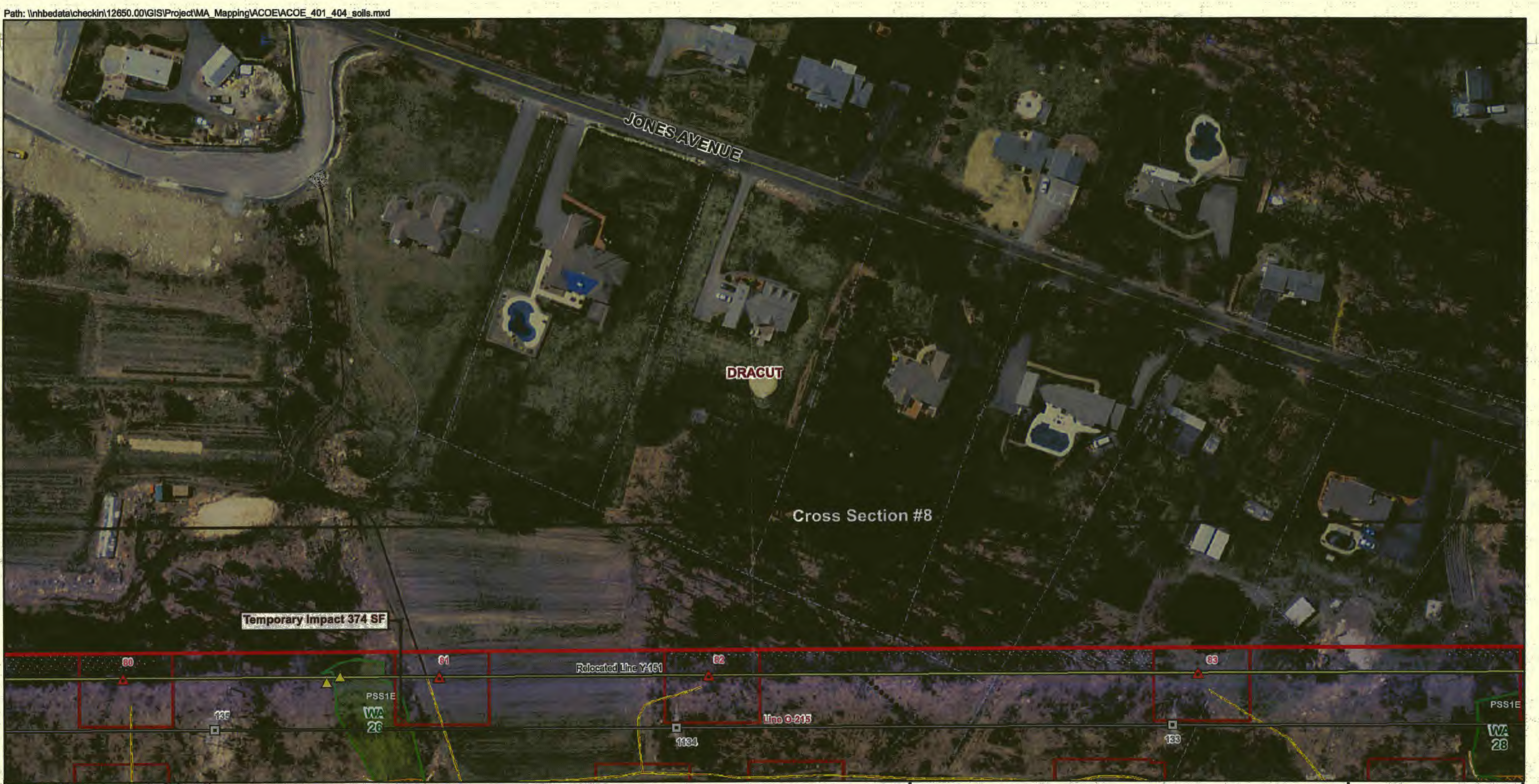

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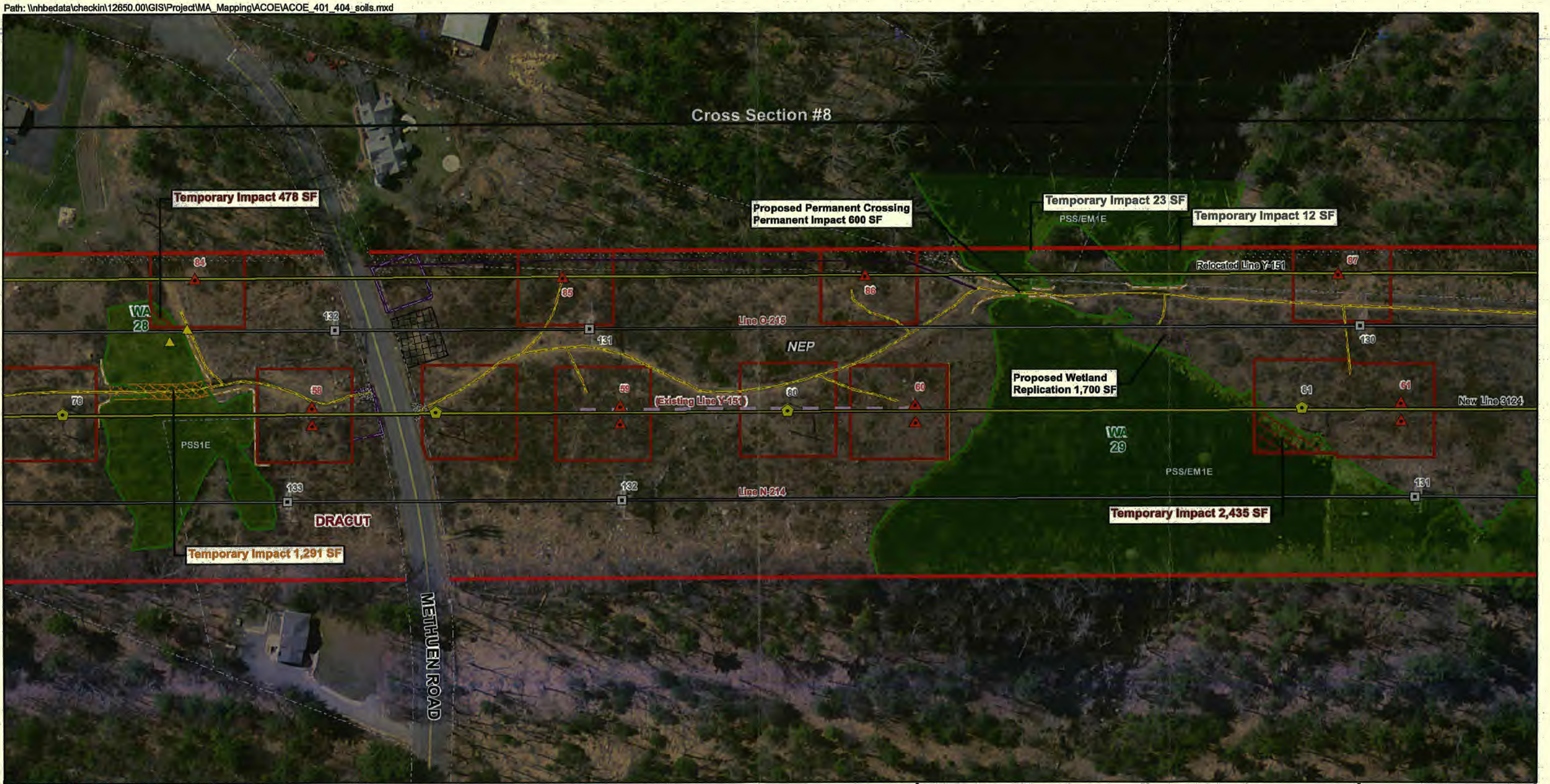

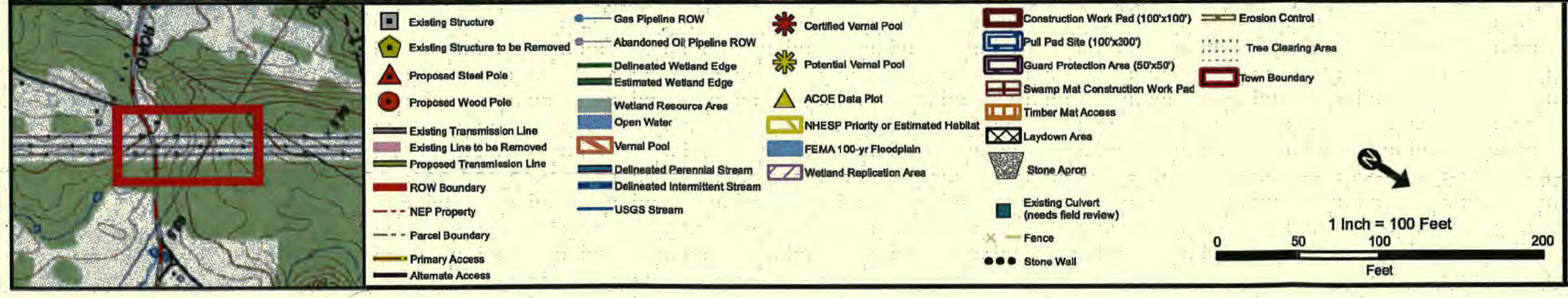

Merrimack Valley Reliability Project

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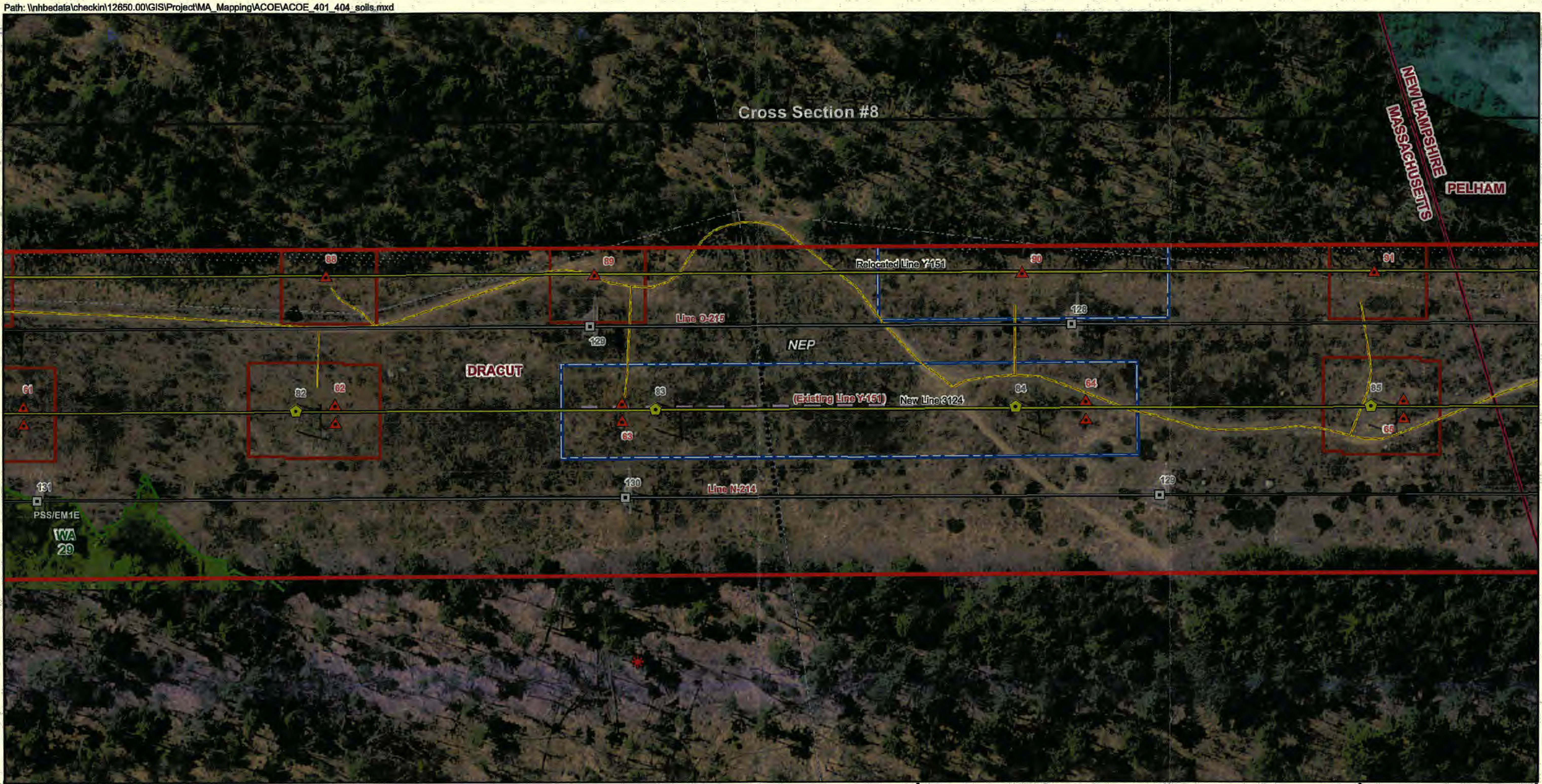

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Attachment B

Merrimack Valley Reliability Project

Tewksbury, Andover, Dracut, Massachusetts

Notice of Minor Modification for Chapter 91 Waterways Licenses for Merrimack River Crossing

vhb

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Mark R. Rielly
Senior Counsel

nationalgrid

November 6, 2015

Via Overnight Mail

Mr. Ben Lynch, Program Chief
Massachusetts Department of Environmental Protection
Waterways Program
1 Winter Street, 5th Floor
Boston, MA 02108

Re: Chapter 91 Notice of Minor Modification
New England Power Company d/b/a National Grid
Existing Electric Transmission Line Crossings of the Merrimack River
in Dracut, MA and Andover, MA

Dear Mr. Lynch:

As discussed with you in October, enclosed is a Notice of Minor Modification from New England Power Company d/b/a National Grid in connection with its proposed Merrimack Valley Reliability Project. Please feel free to contact me at the number below, or Wendy Levine at (781) 907-1870, if you have any questions or would like to discuss this Notice further. Thank you for your cooperation and attention to this matter.

Very truly yours,

Mark R Rielly

Mark R. Rielly, Esq.

Enclosure

40 Sylvan Road, Waltham, MA 02451
T: 781-907-2111 ■ F: (781) 296-8091 or -8092 ■ Mark.Rielly@nationalgrid.com ■ www.nationalgrid.com

Notice of Minor Project Modification Form

New England Power Company d/b/a National Grid ("NEP") is planning to construct a new 345 kV electric transmission line (the "3124 Line") within an existing right-of-way ("ROW") between the NEP owned Tewksbury #22A Substation in Tewksbury, Massachusetts and the Scobie Pond Substation in Londonderry, New Hampshire, owned by the Public Service Company of New Hampshire d/b/a Eversource Energy ("PSNH"). NEP's portion of the project includes a crossing of the Merrimack River between Dracut and Andover (the "Project"). NEP has determined that the planned activities described below qualify for a Minor Project Modification under 310 CMR 9.22(3) and therefore seeks DEP's affirmative concurrence with this determination within 30 days of this Notice.

1. Project Proponent Information

Company Name:

New England Power Company d/b/a National Grid
40 Sylvan Road
Waltham, MA 02451

Company Representative:

Name: Wendy B. Levine, Esq.
Telephone Number: 781-907-1870
Email Address: wendy.levine@nationalgrid.com

2. Property Information:

Location: Existing Transmission Line Crossings of the Merrimack River
City/Town: Dracut, MA and Andover, MA

3. Name of the affected waterways:

The Merrimack River.

4. Existing waterways license or exemption. Check one of the following:

X Existing structures and uses authorized by the following waterways license(s) (provide license # and date):

This crossing of the Merrimack River between the towns of Dracut and Andover currently includes five (5) separate transmission lines and a distribution circuit, as depicted in the aerial representation of the Project attached as Tab 1. Only the transmission lines over the Merrimack River are jurisdictional. The transmission line structures are not within Chapter 91 jurisdiction. The two licenses for the crossings that are affected by this notice are listed in the table below and attached in Tab 2. The license numbers of all six jurisdictional crossings are depicted on the first plan attached in Tab 3.

License Number	Date	Licensee
Department of Public Works License No. 1145	June 14, 1930	New England Power Company
Department of Public Works License No. 2757	May 26, 1945	New England Power Company

5. **The Project involves one or more of the following activities in jurisdictional waterways that will not result in a significant deviation from either (a) the original specifications or uses in the existing waterway license; or (b) the specifications or uses that predated January 1, 1984 (check all that apply):**

☐ Increase in structure height by replacing existing structure(s) within the same alignment, either within or outside of footprint of original structure.

☐ Structure replacement within the same alignment, but outside of footprint of original structure.

☐ Adding a new shield wire to an existing transmission line.

☐ Structure replacement outside of alignment but within existing ROW.

X Change in alignment of conductors where clearance to jurisdictional waterway remains the same or greater and the conductors are within existing ROW (and the structures are outside of c. 91 jurisdiction).

☐ Substation enlargements or rebuilds within same footprint.

☐ Addition of new equipment within the footprint of existing facilities.

☐ Replacement of existing underground duct bank with larger size duct bank within the same alignment, but outside of footprint of original structure.

☐ Replacement of buried cables with larger cables or cables within new duct bank within the same alignment, but outside of footprint of original structure.

☐ Change of alignment of existing underground duct bank within existing ROW.

☐ Environmental response actions under state or federal environmental laws.

☐ Other (describe below).

6. **Brief description of planned activities (the Project):**

The Project involves the construction of a new 345 kV electric transmission line (the "3124 Line") within an existing ROW between the NEP-owned Tewksbury #22A Substation in Tewksbury, Massachusetts, and the PSNH owned Scobie Pond Substation in Londonderry, New Hampshire. To accommodate the new 3124 Line, NEP will shift two existing transmission lines to new locations within the ROW over the Merrimack River and rename an existing transmission line over the Merrimack River. Specifically, as shown in the figure attached at Tab 1 and the plans attached at Tab 3, NEP proposes to shift the existing N-214 Line to the northeast by 33.5 feet and shift the existing 397 Line to the northeast by 75 feet. The existing transmission cables currently used for the 397 Line will be left in place and renamed the new 3124 Line.

All of this work will occur within the existing ROW and the heights of the reconstructed transmission wires over the Merrimack River will not be lower than the existing lines. These changes to the existing utilities over the Merrimack River represent an insignificant deviation from existing, licensed conditions, occur entirely within the existing ROW and will not impact navigation or otherwise impair access to water-dependent uses of the Merrimack River. As such, the changes qualify as a minor project modification under 310 CMR 9.22(3).

7. **Attached are the following (including site location, references to existing waterways licenses and existing and proposed structures):**

- TAB 1: Aerial depiction of the Project over the Merrimack River between Dracut and Andover.
- TAB 2: Relevant Chapter 91 licenses.
- TAB 3: Engineering plans for the Project.

Wendy Levine /MRR
Signature of Representative

Wendy B. Levine, Esq.
Representative Name

November 6, 2015
Date

FOR DEP USE ONLY:

DEP hereby concurs with this Minor project Modification Notice. Or pursuant to 310 CMR 9.22(3), if DEP does not respond to or object to this Notice within 30 days of the submission date above, National Grid may proceed with the proposed work without further DEP authorization.

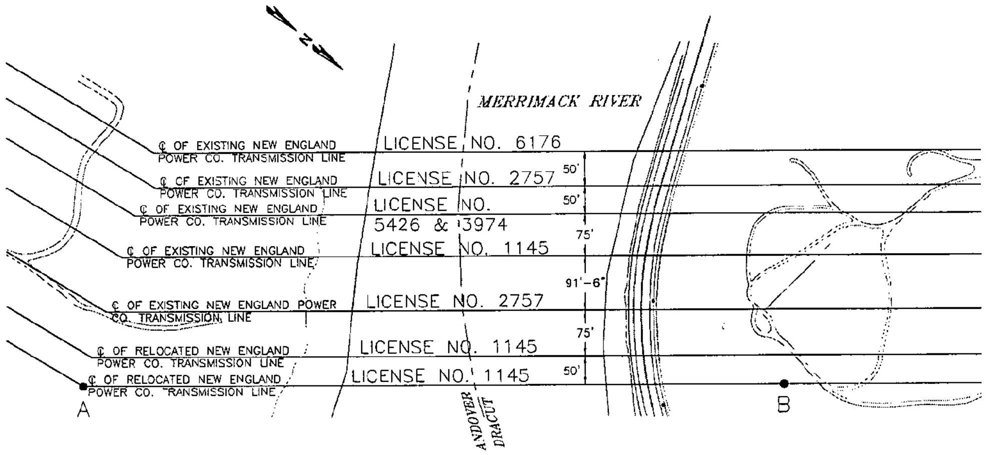
DEP Waterways Division Chief

____
Signature

____
Name

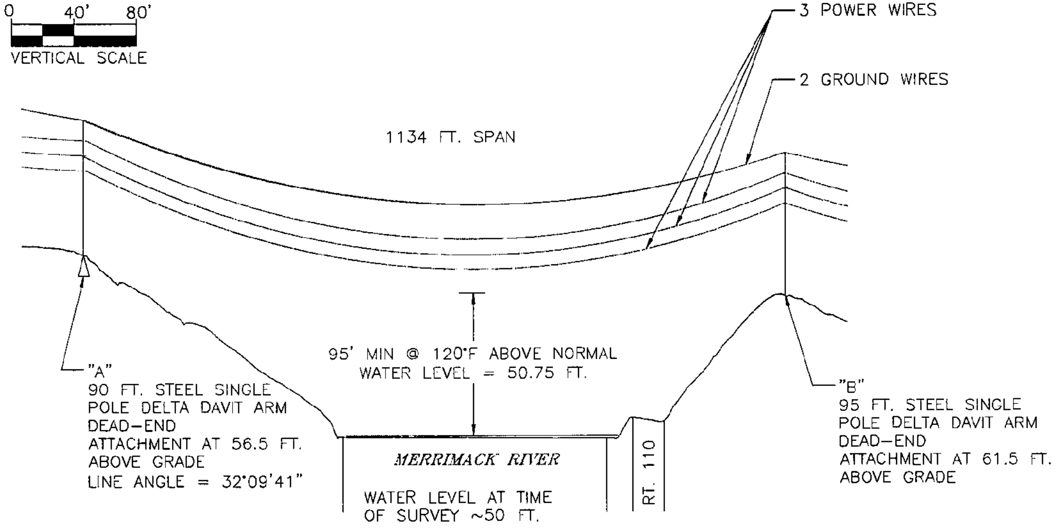
____
Date

SPECIFIC PROJECT FOR WHICH IT HAS BEEN TRANSMITTED. ANY OTHER USE, ITS TRANSMITTAL TO THIRD PARTIES, OR ITS REPRODUCTION WITHOUT PRIOR EXPRESS WRITTEN AUTHORIZATION OF NATIONAL GRID IS STRICTLY PROHIBITED.


N
MERRIMACK RIVER
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 6176
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 2757
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 5426 & 3974
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 1145
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 2757
℄ OF RELOCATED NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 1145
℄ OF RELOCATED NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 1145
50'
50'
75'
91'-6"
75'
50'
ANDOVER
DRACUT
A
B

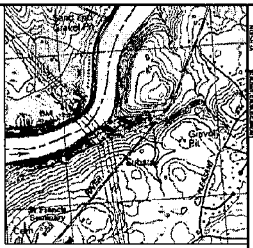
0 200'
HORIZONTAL SCALE
0 40' 80'
VERTICAL SCALE

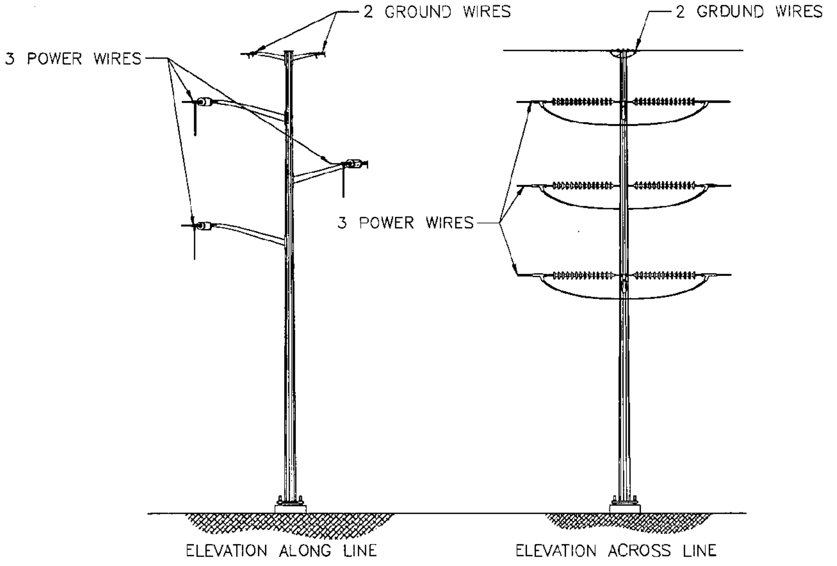
REFER TO 400298-C-L-012 FOR ADDITIONAL PLAN VIEW DETAILS OF WIRE CROSSINGS


3 POWER WIRES
2 GROUND WIRES
1134 FT. SPAN
95' MIN @ 120°F ABOVE NORMAL WATER LEVEL = 50.75 FT.
MERRIMACK RIVER
WATER LEVEL AT TIME OF SURVEY ~50 FT.
RT. 110

"A"
90 FT. STEEL SINGLE
POLE DELTA DAVIT ARM
DEAD-END
ATTACHMENT AT 56.5 FT.
ABOVE GRADE
LINE ANGLE = 32°09'41"

"B"
95 FT. STEEL SINGLE
POLE DELTA DAVIT ARM
DEAD-END
ATTACHMENT AT 61.5 FT.
ABOVE GRADE





STRUCTURE DETAILS
STRUCTURES "A" & "B"
SCALE: N.T.S.

PLAN ACCOMPANYING PETITION OF
NEW ENGLAND POWER COMPANY TO
MODIFY AND MAINTAIN A POWER
TRANSMISSION LINE OVER AND
ACROSS MERRIMACK RIVER IN
DRACUT & ANDOVER, MASSACHUSETTS
SEPTEMBER 03, 2015

VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED
1	09/03/15	CHAPTER 91 MERRIMACK RIVER CROSSING	DD	FTX	NPA
2					
3					
4					
5					
6					
7					

VERSION
1

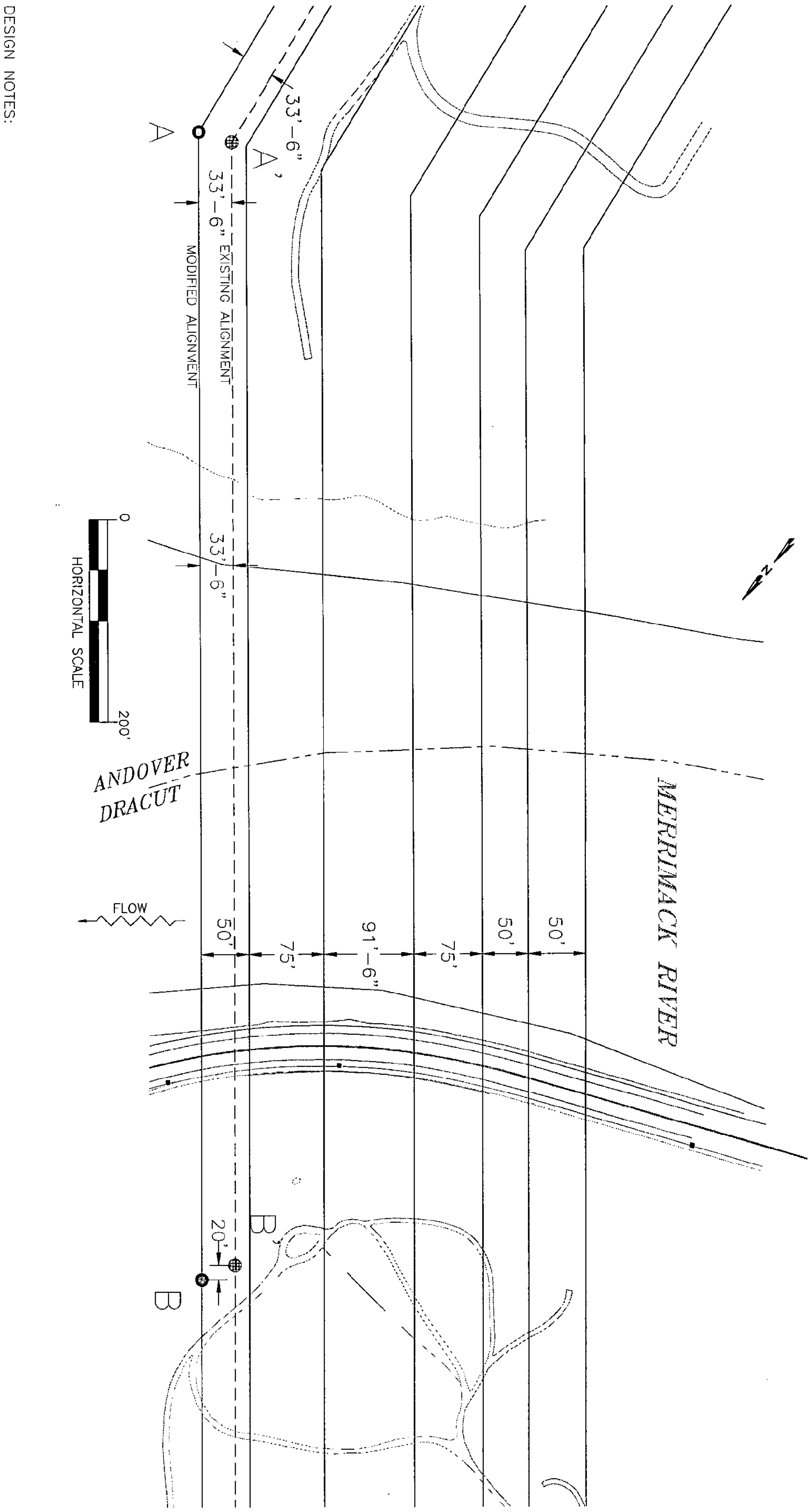
nationalgrid

PREPARED BY	DD	09/03/15
REVIEWED BY	FTX	09/03/15
APPROVED BY	NPA	09/03/15
SCALE	-	
SHEET	1 OF 1	
W/DEX	400298	

MERRIMACK VALLEY RELIABILITY PROJECT
MERRIMACK RIVER CROSSING
DRACUT & ANDOVER, MA
LINE N214 230KV

INCHES ON ORIGINAL

SPECIFIC PROJECT FOR WHICH IT HAS BEEN TRANSMITTED. ANY OTHER USE, ITS TRANSMITTAL TO THIRD PARTIES, OR ITS REPRODUCTION WITHOUT PRIOR EXPRESS WRITTEN AUTHORIZATION OF NATIONAL GRID IS STRICTLY PROHIBITED.



DESIGN NOTES:
- MODIFIED ALIGNMENT HAS BEEN RELOCATED 33'-6" OFFSET FROM EXISTING ALIGNMENT

INCHES ON ORIGINAL

MERRIMACK VALLEY RELIABILITY PROJECT
MERRIMACK RIVER CROSSING
DETAILED N214 PLAN VIEW
EXISTING VS. PROPOSED
DRACUT & ANDOVER, MA

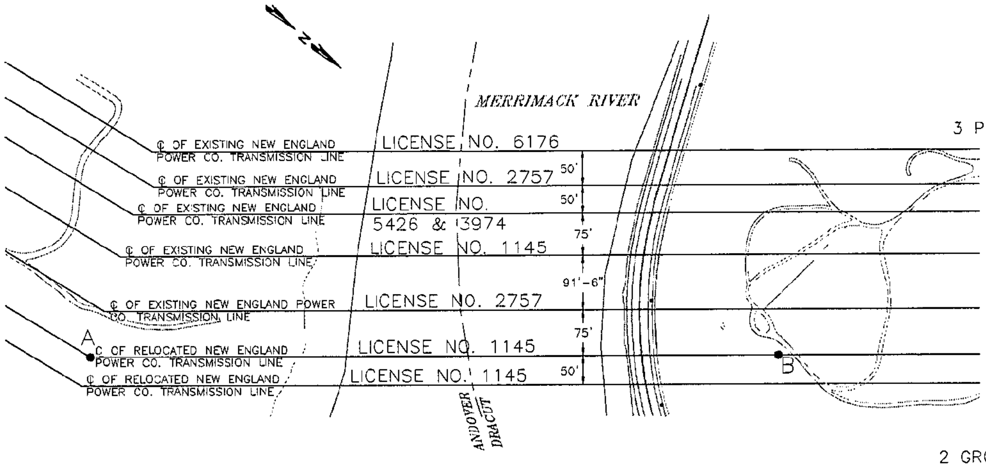
PREPARED BY	DD	09/03/15
REVIEWED BY	FTX	09/03/15
APPROVED BY	NPA	09/03/15
SCALE	–	
SHEET	1 OF 1	
INDEX	400298	

nationalgrid

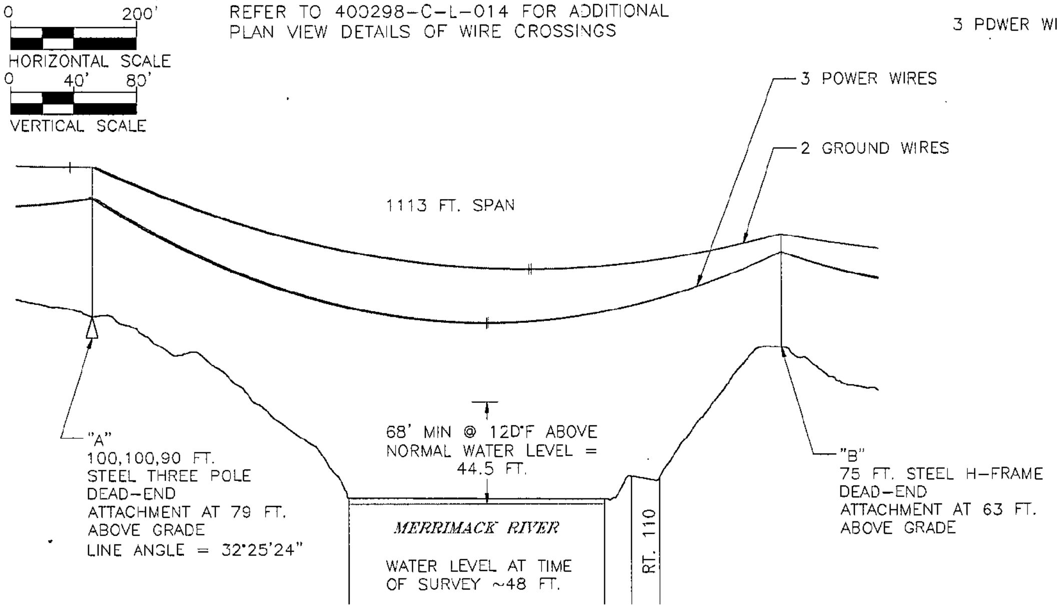
VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED
1	09/03/15	CHAPTER 91 MERRIMACK RIVER CROSSING	DD	FTX	NPA
2					
3					
4					
5					
6					
7					

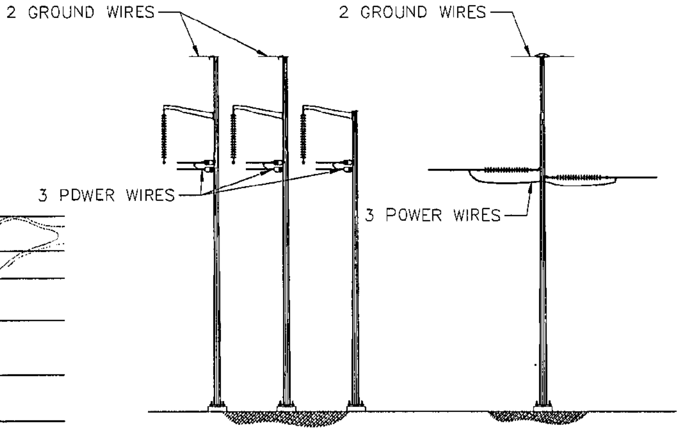
VERSION
1

SPECIFIC PROJECT FOR WHICH IT HAS BEEN TRANSMITTED. ANY OTHER USE, ITS TRANSMITTAL TO THIRD PARTIES, OR ITS REPRODUCTION WITHOUT PRIOR EXPRESS WRITTEN AUTHORIZATION OF NATIONAL GRID IS STRICTLY PROHIBITED.

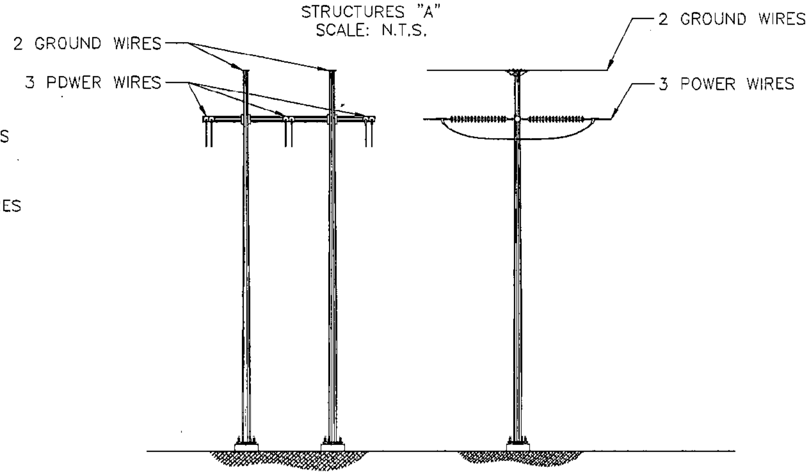

N
MERRIMACK RIVER
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 6176
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 2757
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 5426 & 13974
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 1145
℄ OF EXISTING NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 2757
A
℄ OF RELOCATED NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 1145
℄ OF RELOCATED NEW ENGLAND POWER CO. TRANSMISSION LINE
LICENSE NO. 1145
50'
50'
75'
91'-6"
75'
50'
ANDOVER
DRACUT
B

REFER TO 400298-C-L-014 FOR ADDITIONAL PLAN VIEW DETAILS OF WIRE CROSSINGS

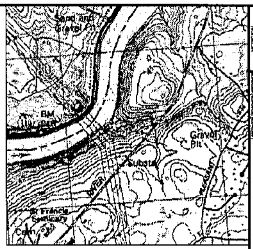




STRUCTURE DETAILS
STRUCTURES "A"
SCALE: N.T.S.



STRUCTURE DETAILS
STRUCTURES "B"
SCALE: N.T.S.



PLAN ACCOMPANYING PETITION OF NEW ENGLAND POWER COMPANY TO MODIFY AND MAINTAIN A POWER TRANSMISSION LINE OVER AND ACROSS MERRIMACK RIVER IN DRACUT & ANDOVER, MASSACHUSETTS SEPTEMBER 03, 2015

VER	DATE	VERSION DESCRIPTION	PREPARED	REVISED	APPROVED
1	09/03/15	CHAPTER 91 MERRIMACK RIVER CROSSING	DD	FTX	NPA
2					
3					
4					
5					
6					
7					

VERSION 1

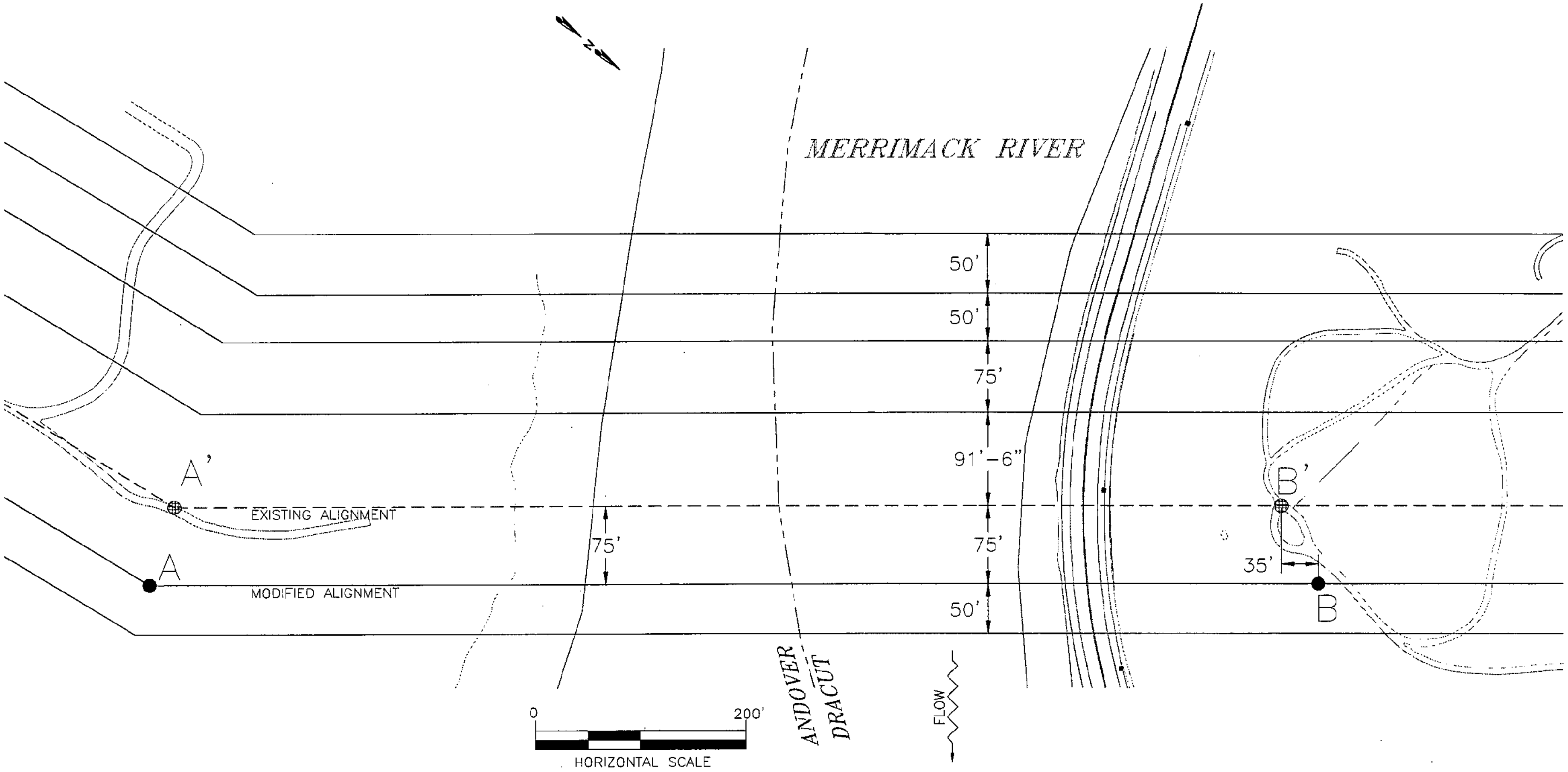
nationalgrid

MERRIMACK VALLEY RELIABILITY PROJECT
MERRIMACK RIVER CROSSING
DRACUT & ANDOVER, MA
LINE 397 345kV

PREPARED BY	DD	09/03/15
REVISED BY	FTX	09/03/15
APPROVED BY	NPA	09/03/15
SCALE	-	
SHEET	1 OF 1	
INDEX	400298	

INCHES ON ORIGINAL

SPECIFIC PROJECT FOR WHICH IT HAS BEEN TRANSMITTED. ANY OTHER USE, ITS TRANSMITTAL TO THIRD PARTIES, OR ITS REPRODUCTION WITHOUT PRIOR EXPRESS WRITTEN AUTHORIZATION OF NATIONAL GRID IS STRICTLY PROHIBITED.



DESIGN NOTES:
- MODIFIED ALIGNMENT HAS BEEN RELOCATED 75' OFFSET FROM EXISTING ALIGNMENT

MERRIMACK VALLEY RELIABILITY PROJECT
MERRIMACK RIVER CROSSING
DETAILED 397 PLAN VIEW
EXISTING VS. PROPOSED
DRACUT & ANDOVER, MA

PREPARED BY	DD	09/03/15
REVIEWED BY	FTX	09/03/15
APPROVED BY	NPA	09/03/15
SCALE	-	
SHEET	1 OF 1	
INDEX	400298	

nationalgrid

VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED	VERSION
1	09/03/15	CHAPTER 91 MERRIMACK RIVER CROSSING	DD	FTX	NPA	1
2						
3						
4						
5						
6						
7						

INCHES ON ORIGINAL

of Deeds volume 543 page 68 in and to the following parcel of real estate in said Town of Methuen viz: Land with building thereon at 27 Marlborough Street being Lots 51 to 56 inclusive on a plan of land of Kensington Heights dated July 1908 and recorded with North District Essex County Registry of Deeds, Book of Plans No. 1, Page No. 9. TO HAVE AND TO HOLD the above released premises, with all the privileges and appurtenances to the same belonging, to the said Arthur LeClaire, his heirs and assigns to his and their use and behoof forever. IN WITNESS WHEREOF the said Town of Methuen has caused its corporate seal to be hereunto affixed, and these presents to be signed, acknowledged and delivered in its name and behalf by George G. Frederick its Treasurer & Tax Collector, hereto duly authorized, this tenth day of June, in the year of our Lord, nineteen hundred and thirty. . . . . . .

Signed and sealed in presence of John T. Douglas.

Town of Methuen (Corporate Seal)
By George G. Frederick
Treasurer & Tax Collector

The Commonwealth of Massachusetts. Essex ss. Methuen, Mass., June 10, 1930. Then personally appeared the above named George G. Frederick, Treasurer & Tax Collector for the Town of Methuen and acknowledged the foregoing instrument to be the free act and deed of said Town of Methuen, before me, John T. Douglas, Justice of the Peace. My commission expires Apr. 29, 1932.

Essex ss. Received June 14, 1930 at 40m past 10A.M. Recorded and Examined.

License
Commonwealth of Massachusetts
to
New England Power Company

See Plan #801

The Commonwealth of Massachusetts. (Seal). No. 1145. Whereas, the New England Power Company, of Boston, in the County of Suffolk and Commonwealth aforesaid, has applied to the Department of Public Works for license to stretch and maintain cables and wires for the transmission of electricity over and across Merrimack River in the towns of Dracut and Andover, and has submitted plans of the same; and whereas due notice of said application, and of the time and place fixed for a hearing thereon, has been given, as required by law, to the Selectmen of the towns of Dracut and Andover; now, said Department, having heard all parties desiring to be heard, and having fully considered said application, hereby, authorizes and licenses the said New England Power Company, subject to the provisions of the ninety first chapter of the General Laws, and of all laws which are or may be in force applicable thereto, to stretch and maintain cables and wires for the transmission of electricity over and across Merrimack River in the towns of Dracut and Andover, in conformity with the accompanying plan No. 1145. Said wires and cables may be stretched from poles and towers upon the upland, as shown on said plan. See Plan Bk. 54 Pl. 86A, See Plan Bk. 54 Pl. 86B, See Plan Bk. 54 Pl. 87A. The telephone wires authorized by this license shall be not less than 29 feet above the level of high water in said river as shown on said plan. The cables comprising the "west circuit", so called, as shown on said plan, shall be not less than 95 feet above the level of high water in said river, and the remaining cables not less than 90 feet above the level of high water in said river, as shown on said plan. This license is granted subject to the laws of the United States, and the acceptance hereof shall constitute an agreement by the said New England Power Company, its successors and assigns, that the height of said cables and wires above the level of high water in said river shall be increased, the location of said wires and cables changed, or said wires and cables placed in or under said river, at any time by order of the Department, after notice and hearing, and upon the further condition that provision is made by the licensee, its successors and assigns, for the grounding of the current in the event of the breaking of the wires or cables. The plan of said work, numbered 1145, is on file in the office of said Department, and duplicate of said plan accompanies this license, and is to be referred to as a part hereof. Nothing in this license shall be construed as to impair the legal rights of any person. This license shall be void unless the same and the accompanying plan are recorded within one year from the date hereof, in the Registries of Deeds for the Northern District of the County of Essex and the Northern District of the County of Middlesex. IN WITNESS WHEREOF, said Department of Public Works have hereunto set their hands this fifteenth day of April in the year nineteen hundred and thirty. F. E. Lyman, Richard K. Hale, H. A. MacDonald. Department of Public Works.

Essex ss. Received June 14, 1930 at 45m past 10A.M. Recorded and Examined.

Discharge
Kelly
to
Lunn
et ux
Mort. Rec.
B.523 P.278

I, Annie Kelly, holder of a mortgage from Harold Lunn and Anna Mary Lunn, husband and wife to me, the said Annie Kelly, as Annie Kelley, dated July 1, 1926, recorded with Essex County (North District) Deeds book 523, page 278, acknowledge satisfaction of the same. WITNESS my hand and seal this 9th day of July, 1929. . . . .

Commonwealth of Massachusetts. Essex ss. } Annie Kelly (seal)

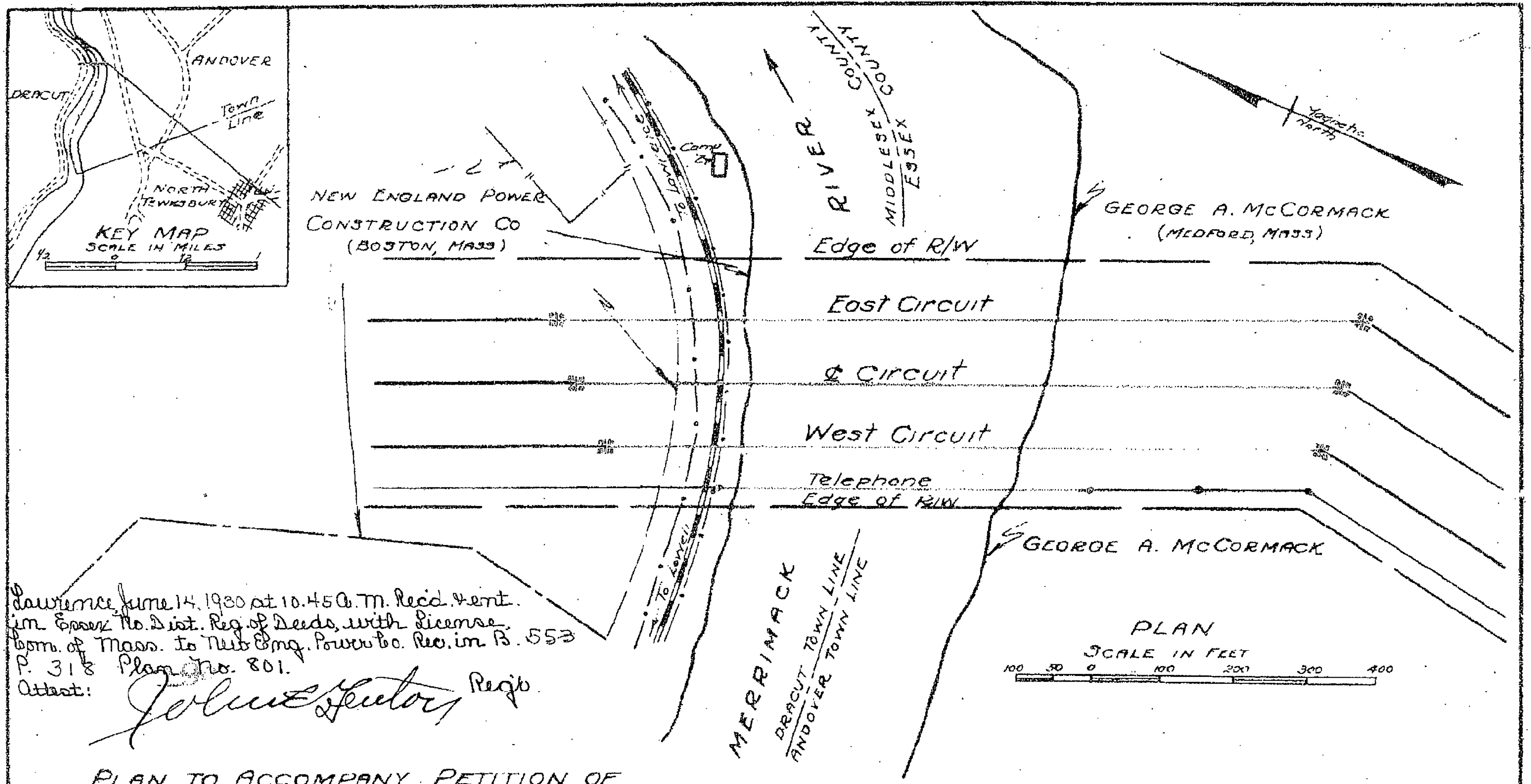
July 9, 1929. Then personally appeared the above named Annie Kelly and acknowledged the foregoing instrument to be her free act and deed, before me, Miriam F. Campbell, Notary Public. My commission expires July 17, 1931.

Essex ss. Received June 14, 1930 at 50m past 10A.M. Recorded and Examined.

Kelly
to
Gagnon

I, Annie Kelly, sometimes known as Annie Kelley, of North Andover, Essex County, Massachusetts, being married, for consideration paid, grant to

801



Lawrence, June 14, 1930 at 10.45 a.m. Rec'd & ent.
in Essex No. Dist. Reg. of Deeds, with License
Com. of Mass. to New Eng. Power Co. Rec. in B. 553
P. 318 Plan No. 801.
Attest: Regr.

PLAN TO ACCOMPANY PETITION OF

NEW ENGLAND POWER CO
TO CONSTRUCT A
TRANSMISSION LINE
ACROSS THE MERRIMACK RIVER

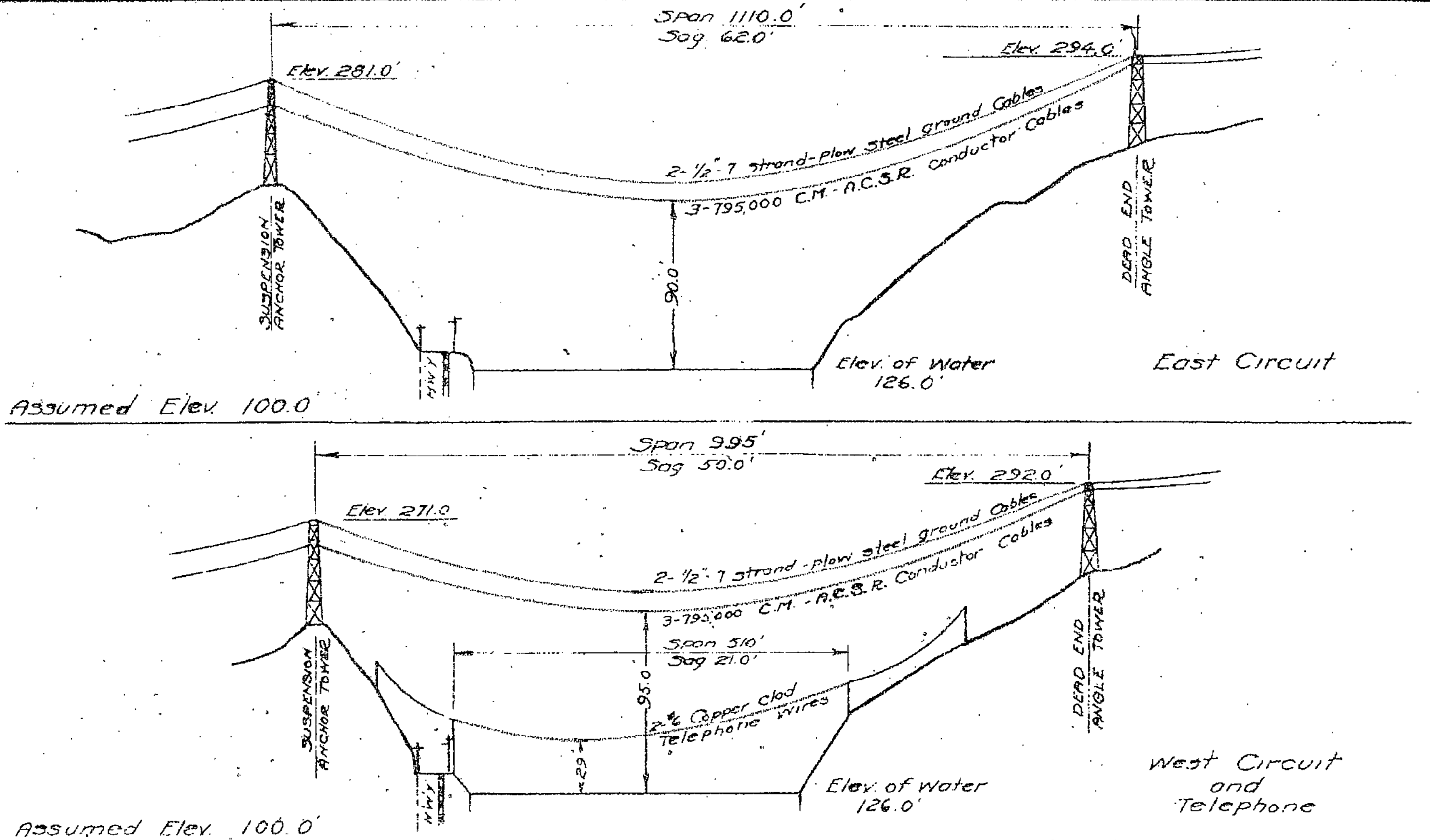
FEBRUARY 1930

SHEET 1 OF 3 SHEETS

NO. 1145
APPROVED BY DEPARTMENT OF PUBLIC WORKS
APRIL 15, 1930

.... } COMMISSIONER OF PUBLIC WORKS

.... } ASSOCIATE COMMISSIONERS
....

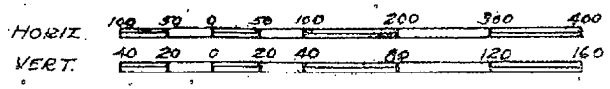


Note:- Clearance above Water on ℄ Circuit not less than 90.0'

Span 1050.0' Sag 55.0'

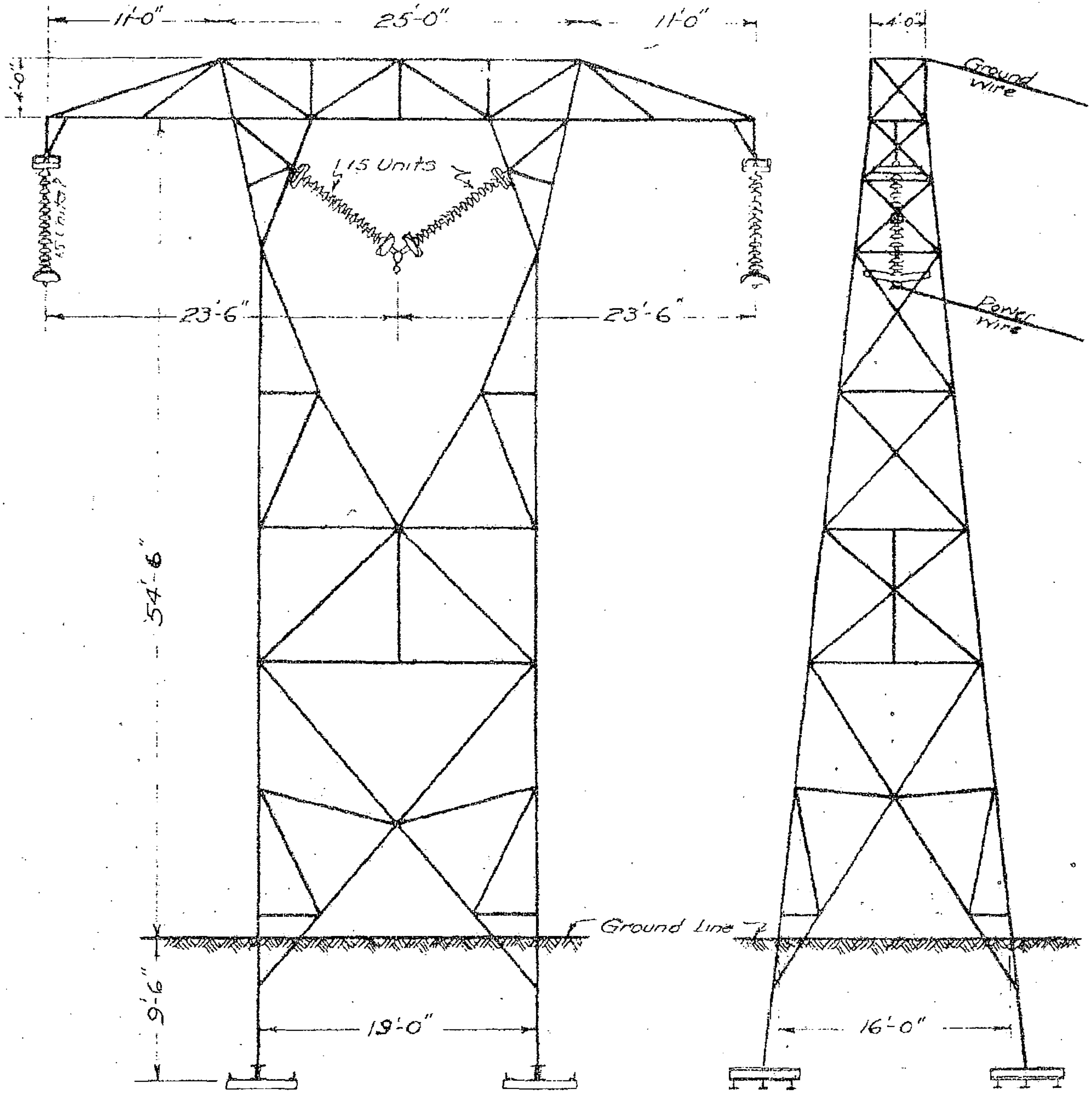
PROFILE

SCALE IN FEET



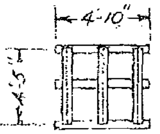
SHEET 2 OF 3 SHEETS

LICENSE PLAN NO. 1145
APPROVED APRIL 15, 1930



PLAN OF TOWERS

SCALE IN FEET



PLAN OF FOUNDATIONS

LICENSE PLAN NO. 1145
APPROVED APRIL 15, 1930

SHEET 3 OF 3 SHEETS

for the year 1945. We, Irene H. Flanagan, wife of said grantor Michael A. Flanagan, Elizabeth M. Flanagan, wife of said grantor Charles F. Flanagan, John P. Kane, husband of said grantor Mary E. Kane, Harriet R. Flanagan, wife of said grantor Joseph V. Flanagan and Frederick V. Collins, husband of said grantor Sarah B. Collins, release to said grantees all rights of tenancy by the CURTESY, DOWER and HOMESTEAD and other interests therein. WITNESS our hands and seals this first day of April 1945.)Michael A. Flanagan (seal) Charles F. Flanagan (seal) John P. Kane (seal) Joseph V. Flanagan (seal) Frederick V. Collins (seal) Irene H. Flanagan (seal) Elizabeth M. Flanagan (seal) Mary E. Kane (seal) Harriet R. Flanagan (seal) Sarah B. Collins (seal). The Commonwealth of Massachusetts. Essex,ss. April 1, 1945. Then personally appeared the above named Charles F. Flanagan and acknowledged the foregoing instrument to be his free act and deed, before me, John J. Fox, Jr., Notary Public. My commission expires July 9, 1948.

Essex,ss.Received May 26,1945 at 50m past 10A.M.Recorded and Examined.

License

Commonwealth of
Massachusetts
to
New England
Power Company

See Plan #1527

The Commonwealth of Massachusetts. No. 2757. (Seal) Whereas, New England Power Company, of Boston, in the County of Suffolk and Commonwealth aforesaid, has applied to the Department of Public Works for license to stretch and maintain cables and wires for the transmission of electricity over and across Merrimack River at its property in the towns of Andover and Dracut, and has submitted plans of the same; and whereas due notice of said application, and of the time and place fixed for a hearing thereon, has been given, as required by law, to the Selectmen of the towns of Andover and Dracut; Now, said Department, having heard all parties desiring to be heard, and having fully considered said application, hereby, authorizes and licenses the said New England Power Company, subject to the provisions of the ninety first chapter of the General Laws, and of all laws which are or may be in force applicable thereto, to stretch and maintain cables and wires for the transmission of electricity over and across Merrimack River at its property in the towns of Andover and Dracut, in conformity with the accompanying plan No. 2757. Said wires and cables may be stretched from wood pole structures upon the upland, as shown on said plan. The cables shall be not less than 90 feet above the level of high water in said River, as shown on said plan. This license is granted subject to the laws of the United States, and the acceptance hereof shall constitute an agreement by the said New England Power Company, its successors and assigns, that the height of said cables and wires above the level of high water in said River shall be increased, the location of said wires and cables changed, or said wires and cables placed in or under said River, at any time by order of the Department, after notice and hearing, and upon the further condition that provision is made by the licensee, its successors and assigns, for the grounding of the current in the event of the breaking of the wires or cables. The plan of said work, numbered 2757, is on file in the office of said Department, and duplicate of said plan accompanies this License, and is to be referred to as a part hereof. Nothing in this License shall be so construed as to impair the legal rights of any person. This license shall be void unless the same and the accompanying plan are recorded within one year from the date hereof, in the Registries of Deeds for the Northern District of the County of Essex and the Northern District of the County of Middlesex. IN WITNESS WHEREOF, said Department of Public Works have hereunto set their hands this second day of May, in the year nineteen hundred and forty five. H. A. MacDonald, George W. Schryver, Department of Public Works. Approved, Richard K. Hale, Director Division of Waterways.

Essex,ss. Received May 26, 1945 at 11 A.M. Recorded and Examined.

Bell
to
Wlodyka
et ux

****
* U. S. *
* I. R. *
* Stamp *
* $.55 *
Cancelled
* *
****

I, Jennie Bell of Methuen, Essex County, Massachusetts, being unmarried, for consideration paid, grant to Edward J. Wlodyka and Stella Wlodyka, husband and wife, both of said Methuen as joint tenants and not as tenants in common nor as tenants by entirety, with QUITCLAIM covenants a certain tract of land situated in said Methuen and being lots #169, 170, 171 and 207 on a plan of land entitled "Fairview, Methuen, Mass. dated 1894, Joseph S. Howe, Surveyor and recorded with North District Essex Deeds, book 133, page 600." My title to this property is derived as a devisee under the will of Alice Bell, late of Methuen (see Probate Document #199558). WITNESS my hand and seal this twenty second day of May 1945. . . . . . .) Jennie Bell (seal)

The Commonwealth of Massachusetts. Essex,ss. May 22, 1945. Then personally appeared the above named Jennie Bell and acknowledged the foregoing instrument to be her free act and deed, before me, Max Nicholson, Notary Public. My commission expires December 8, 1945.

Essex,ss.Received May 26,1945 at 9m past 11A.M. Recorded and Examined.

Discharge
Gallant
Extrx.
to
Nelb
Mort. Rec.
B.669, P.344.

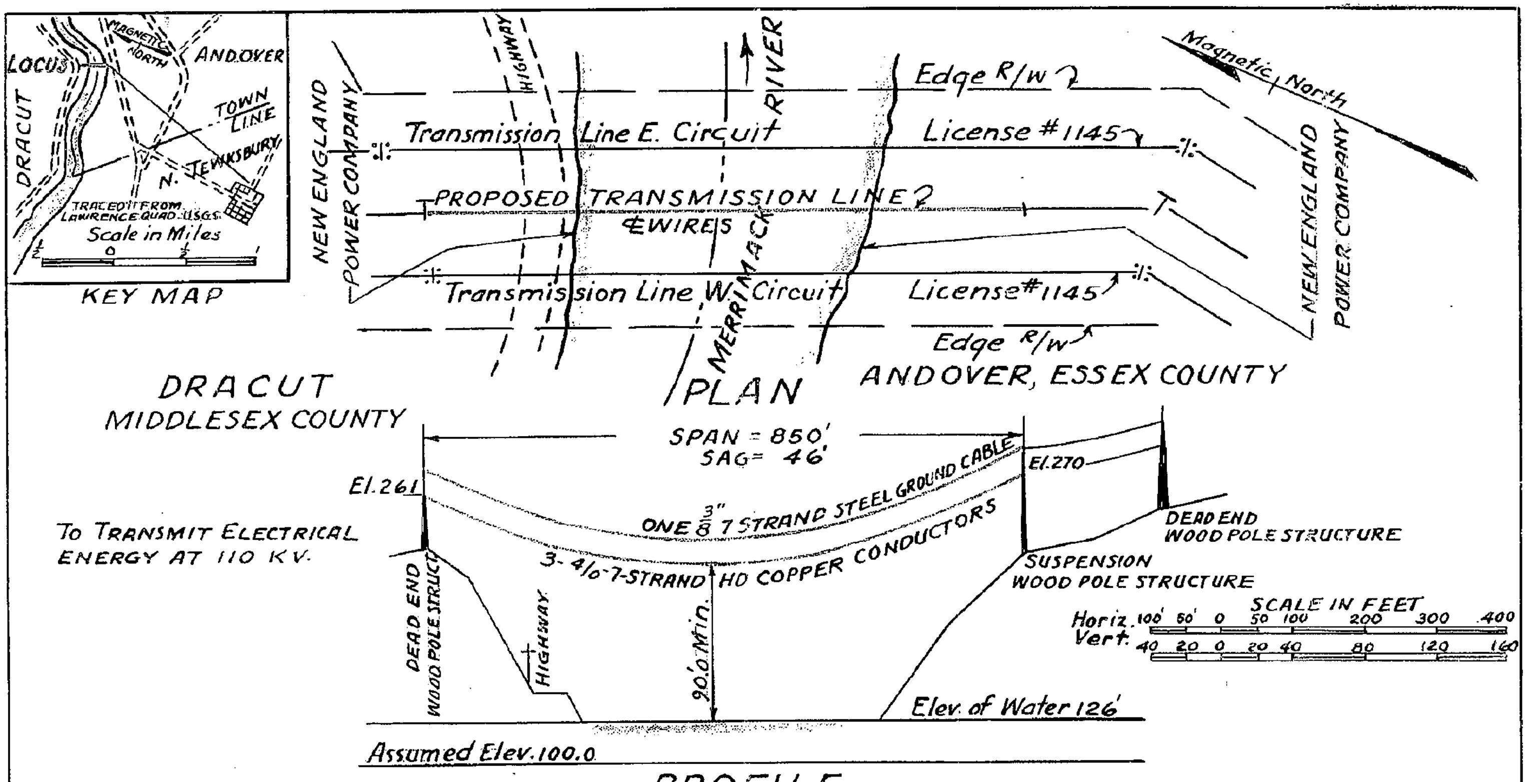
I, Gertrude Nelb Gallant, Executrix of the will of Margaret Nelb, holder of a mortgage from Robert H. Nelb to me, dated November 28, 1944, recorded with North District of Essex County Registry of Deeds book 669, page 344, acknowledge satisfaction of the same. WITNESS my hand and seal this 28th day of April 1945.) Gertrude Nelb Gallant (seal)

State of Connecticut. Hartford,ss.) Exec.

April 28, 1945. Then personally) Est. of Margaret Nelb

appeared the above named Gertrude Nelb Gallant, Executrix, and acknowl-

Lawrence, May 26, 1945 11 A.M.
Rec'd & entered in No. Dist. Essex Reg. of Deeds
See License B. 673, P. 341. Plan # 1527
Attest. G. Hudson Driver, Reg'r.


LOCUS
MAGNETIC NORTH
ANDOVER
DRACUT
TOWN LINE
N. TEWKSBURY
TRACED FROM LAWRENCE QUAD. U.S.G.S.
Scale in Miles
½ 0 ½ 1
KEY MAP
NEW ENGLAND POWER COMPANY
HIGHWAY
Transmission Line E. Circuit
PROPOSED TRANSMISSION LINE
4 WIRES
Transmission Line W. Circuit
MERRIMACK RIVER
Edge R/W
License #1145
License #1145
Edge R/W
Magnetic North
NEW ENGLAND POWER COMPANY
DRACUT
MIDDLESEX COUNTY
PLAN
ANDOVER, ESSEX COUNTY
SPAN = 850'
SAG = 46'
El. 261
El. 270
ONE 3/8" 7 STRAND STEEL GROUND CABLE
3-4/0-7-STRAND HD COPPER CONDUCTORS
To TRANSMIT ELECTRICAL ENERGY AT 110 KV.
DEAD END WOOD POLE STRUCT.
HIGHWAY
90.0' Min.
DEAD END WOOD POLE STRUCTURE
SUSPENSION WOOD POLE STRUCTURE
SCALE IN FEET
Horiz. 100' 50' 0 50 100 200 300 400
Vert. 40 20 0 20 40 80 120 160
Elev. of Water 126'
Assumed Elev. 100.0

PROFILE

PLAN TO ACCOMPANY PETITION OF
NEW ENGLAND POWER COMPANY
TO CONSTRUCT A TRANSMISSION LINE
ACROSS THE MERRIMACK RIVER
APRIL 1945

NO. 2757
APPROVED BY DEPARTMENT OF PUBLIC WORKS
MAY 2 1945
COMMISSIONER OF PUBLIC WORKS
George W. Schryver
ASSOCIATE COMMISSIONERS
Richard K. Hale
DIRECTOR-DIVISION OF WATERWAYS

Attachment C

Merrimack Valley Reliability Project

Tewksbury, Andover, Dracut, Massachusetts

Wetlands Replication Plans

vhb

NOTES

DEWATERING:

1. CONSTRUCTION ACTIVITIES IN STREAMS WILL BE SCHEDULED FOR PERIODS WHEN FLOWS ARE ANTICIPATED TO BE AT A MINIMUM. IF THERE IS FLOWING WATER DURING CONSTRUCTION, THE FLOW SHALL BE DIVERTED AROUND THE WORK SITE IN A STABLE MANNER USING METHODS APPROVED BY THE ENGINEER.
2. THE CONTRACTOR SHALL FURNISH AND OPERATE DEWATERING MEASURES AND EQUIPMENT TO CONTROL WATER LEVELS WITHIN THE EXCAVATION IF SURFACE, RAIN, OR GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.
3. THE CONTRACTOR SHALL INSTALL THE DEWATERING SYSTEM TO MINIMIZE COLLECTION OF SUSPENDED SOLIDS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT THE DEWATERING SYSTEMS IS SUFFICIENT TO MAINTAIN A DRY EXCAVATION.
5. WATER DISCHARGED FROM DEWATERING OPERATIONS SHALL BE DIRECTED TO AN UPLAND SEDIMENT SETTLING FACILITY OR FILTRATION DEVICE (I.E. FILTER BAG, SETTLING TANK, OR APPROVED EQUIVALENT).
6. DEWATERING SYSTEM SHALL DISCHARGE OUTSIDE THE JURISDICTIONAL RESOURCE AREAS. ALL WATER SHALL BE DETAINED AND TREATED TO REDUCE VELOCITY AND REMOVE SEDIMENTS BEFORE BEING DISCHARGED OR ALLOWED TO INFILTRATE.
7. CONTRACTOR SHALL DISPOSE OF DEWATERING DISCHARGE IN ACCORDANCE WITH APPLICABLE REGULATIONS, ORDINANCES, AND INSTRUCTIONS OF THE AUTHORITIES HAVING JURISDICTION.
8. ANY DAMAGE RESULTING FROM DEWATERING OPERATIONS, OR THE FAILURE OF THE CONTRACTOR TO IMPLEMENT A DEWATERING SYSTEM SHALL BE REPAIRED BY THE CONTRACTOR.
9. DEBRIS CONTAINMENT, SEDIMENT, AND TURBIDITY CONTROL MEASURES SHALL BE EMPLOYED AT ALL TIMES TO ENSURE WATER QUALITY OF ADJACENT STREAMS AND WETLANDS.
10. CONTROL OF WATER WITHIN THE EXCAVATION SHALL BE CONDUCTED IN SUCH A MANNER AS TO PREVENT DISTURBANCE OF THE BEARING SOIL. WELL POINTS, SUMPS, OR OTHER PUMPING AREAS SHALL BE LOCATED OUTSIDE THE FOOTING LIMITS AND PROPERLY FILTERED TO PREVENT PUMPING OF THE SOIL MATERIALS BELOW THE EXCAVATION SUBGRADE.
11. THE CONTRACTOR SHALL RESTORE DISTURBED AREAS TO THEIR ORIGINAL CONDITION, UNLESS OTHERWISE SHOWN ON THE PLANS.

CONCRETE CULVERT AND WETLANDS:

1. CULVERT AND WINGWALL FOOTINGS SHALL BE PLACED ON AT LEAST 12 INCHES OF COMPACTED CLEAN, CRUSHED STONE (ASTM #57) WRAPPED IN MIRAFI 180N NON-WOVEN GEOTEXTILE OR APPROVED EQUIVALENT.
2. ALL UNCONTROLLED FILLS, RELIC STRUCTURES, ORGANICS, AND WOOD DEBRIS SHALL BE COMPLETELY REMOVED BENEATH PROPOSED FOUNDATIONS. THE EXTENT OF REMOVAL SHALL BE 1 FOOT LATERALLY FOR EVERY 1 FOOT OF EXCAVATION OUTSIDE THE PERIMETER OF ALL FOOTINGS.
3. EXCAVATION TO BEARING SURFACES SHALL BE COMPLETED WITH A SMOOTH-EDGED BUCKET TO MINIMIZE DISTURBANCE OF SENSITIVE GLACIAL TILL. DISTURBED AREAS THAT BECOME YIELDING SHALL BE FURTHER DEWATERED, EXCAVATED, AND BACKFILLED WITH CONTROLLED LIFTS OF COMPACTED GRAVEL BACKFILL.
4. THE PRECAST CULVERT, WINGWALLS, AND FOOTINGS SHALL MEET THE DESIGN AND MANUFACTURING REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS EXCEPT AS OTHERWISE SPECIFIED ON THE PLANS AND MUST MEET H-20 LOADING REQUIREMENTS.
5. CALCULATIONS FOR THE DESIGN OF THE CULVERT SECTIONS, FOOTINGS, CONNECTIONS, AND WINGWALLS SHALL BE PREPARED AND STAMPED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF MASSACHUSETTS. CALCULATIONS SHALL BE INCLUDED WITH THE DETAILED SHOP DRAWINGS THAT MUST BE SUBMITTED FOR APPROVAL. DRAWINGS SHALL BE APPROVED PRIOR TO FABRICATION.
6. DETAILS AND LOCATIONS OF ALL ITEMS TO BE EMBEDDED IN THE SECTIONS, METHOD OF CURING, HANDLING, STORING, TRANSPORTING, AND ERECTING SECTIONS SHALL BE INCLUDED IN THE SHOP DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER CASTING, HANDLING, LIFTING, STORING, TRANSPORTING, AND ERECTION OF ALL COMPONENTS SO THAT THEY CAN BE PLACED IN THE COMPLETED STRUCTURE WITHOUT DAMAGE.
7. THE FOLLOWING ARE CONSIDERED DEFECTS WHICH MAY CONSTITUTE CAUSE FOR REJECTION: ANY CRACKS WHICH EXTEND TO THE REINFORCING STEEL; HONEYCOMBS OVER 8 SQUARE INCHES IN AREA AND OVER 1 INCH DEEP; ANY DISCONTINUITY OF THE CONCRETE WHICH MAY PERMIT MOISTURE TO REACH THE REINFORCING STEEL; EDGE OR CORNER BREAKS EXCEEDING 12 INCHES IN LENGTH OR OVER 1 INCH IN DEPTH; DAMAGED ENDS THAT PREVENT MAKING A SATISFACTORY JOINT; EXTENSIVE HAIRLINE CRACKS OR CHECKS; RACKED OR UN-SQURE SECTIONS. THE ENGINEER MAY APPROVE REPAIRS TO OCCASIONAL, NON-RECURRING, AND ISOLATED DEFECTS.
8. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED ¾-INCH UNLESS OTHERWISE NOTED.
9. ALL PRECAST JOINTS SHALL BE SEALED AND COVERED AS RECOMMENDED BY THE MANUFACTURER AND PRIOR TO BACKFILL PLACEMENT.
10. A SILANE SEALANT WATER REPELLENT SHALL BE APPLIED TO ALL EXPOSED SURFACES OF THE PRECAST CULVERT, HEADWALL, AND WINGWALLS TO 12 INCHES BELOW FINISHED GRADE. SEALANT SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

EROSION CONTROL:

1. PRIOR TO STARTING ANY OTHER WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS IDENTIFIED IN FEDERAL, STATE, AND LOCAL APPROVAL DOCUMENTS PERTAINING TO THIS PROJECT.
2. CONTRACTOR SHALL INSPECT AND MAINTAIN EROSION CONTROL MEASURES AND REMOVE SEDIMENT THEREFROM ON A WEEKLY BASIS AND WITHIN TWELVE HOURS AFTER EACH STORM EVENT (½ INCH OF RAINFALL OR GREATER) AND DISPOSE OF SEDIMENTS IN AN UPLAND AREA SUCH THAT THEY DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
3. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION SHALL NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
4. CONTRACTOR SHALL PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
5. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, CONTRACTOR SHALL REMOVE AND DISPOSE OF EROSION CONTROL MEASURES AND CLEAN SEDIMENT AND DEBRIS.
6. AREAS REMAINING UNSTABILIZED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED. STRAW MULCH SHALL BE APPLIED AT A MINIMUM RATE OF 1-½ TONS/ACRE.
7. PERMANENT SEEDING SHALL OCCUR BETWEEN APRIL 1 AND JUNE 1, AND/OR BETWEEN AUGUST 15 AND OCTOBER 15. ALL SEEDING FROM SEPTEMBER 15 SHALL BE STRAW MULCHED.
8. DUST SHALL BE CONTROLLED THROUGH THE USE OF WATER.
9. SOILS TO BE STOCKPILED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED. CONTRACTOR SHALL INSTALL SILT FENCING ALONG DOWNHILL SIDE OF STOCKPILES.
10. CONTRACTOR SHALL PROVIDE NECESSARY EROSION CONTROL MEASURES TO INSURE THAT SURFACE WATER RUN-OFF FROM UNSTABILIZED AREAS DOES NOT CARRY SILT, SEDIMENT, AND OTHER DEBRIS OUTSIDE OF THE LIMITS OF WORK.
11. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
12. SOIL GENERATED AS PART OF POLE INSTALLATION SHALL BE DISPERSED IN AN UPLAND AREA SUCH THAT THEY DO NOT ENCUMBER PROTECTED AREAS.
13. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    - A. BASE COURSE GRAVELS HAVE BEEN INSTALLED AND COMPACTED;
    - B. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
    - C. A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL, SUCH AS STONE OR RIPRAP, HAS BEEN INSTALLED;
    - D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
14. ALL CUT AND FILL SLOPES SHALL BE LOAMED AND SEEDED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
15. EROSION CONTROL BLANKETS SHALL BE INSTALLED ON ALL SLOPES THAT ARE STEEPER THAN 3-FEET HORIZONTAL AND 1-FOOT VERTICAL (3:1). EROSION CONTROL BLANKETS SHALL BE NORTH AMERICAN GREEN SC150BN, OR APPROVED EQUAL.

WETLAND NOTES:

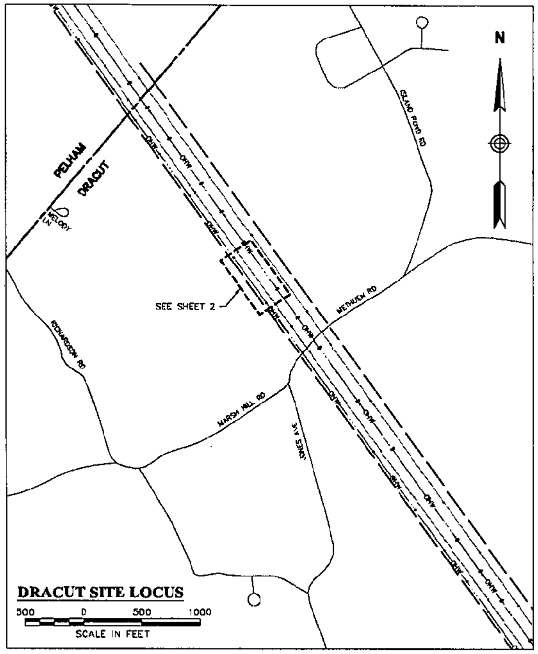
1. WETLAND MITIGATION GRADING SUBJECT TO MODIFICATION BASED ON ACTUAL SITE CONDITIONS.
2. PRIOR TO PLANTING, THE MITIGATION AREA SHOULD BE EXCAVATED APPROXIMATELY 1 FOOT BELOW THE FINISHED GRADE OF THE WETLAND MITIGATION AREA. FOLLOWING EXCAVATION OF THE MITIGATION AREA, A MANMADE SOIL MIXTURE CONSISTING OF EQUAL VOLUMES OF ORGANIC (COMPOST) MATERIAL AND MINERAL SOIL MATERIAL SUCH AS A RICH LOAMY SAND (WITH A LOOSE FRIABLE CONSISTENCY) SHALL BE USED TO BRING THE EXCAVATED WETLAND MITIGATION AREA TO FINISHED GRADE.
3. NO WOOD CHIPS WILL BE ADDED TO THE SOIL AMENDMENTS. AN ENVIRONMENTAL MONITOR WILL REVIEW IMPORTED SOILS TO ENSURE THEY ARE FREE OF WASTE MATERIAL.
4. THE SHRUBS PLANTED IN THE MITIGATION AREA SHOULD BE RANDOMLY PLACED IN CLUSTERS OF THE SAME SPECIES. A CLUSTER WILL CONSIST OF 3 TO 5 SPECIMENS, SPACED ACCORDING TO THE PLANTING SCHEDULE ABOVE.
5. ALL PLANTED SHRUB SPECIMENS SHALL BE EITHER BARE ROOT OR POTTED AND BE INSPECTED BY THE ENVIRONMENTAL MONITOR PRIOR TO PLACING THE SPECIMENS IN THE WETLAND MITIGATION AREA.
6. PENDING AVAILABILITY OF LISTED SPECIES, APPLICABLE SUBSTITUTES MAY BE USED.
7. ESTIMATES OF SEASONAL HIGH GROUNDWATER (SHGW) ARE BASED ON TEST PITS AND FIELD OBSERVATIONS COLLECTED BY A SOIL EVALUATOR FROM VHB ON NOVEMBER 5, 2015.

WETLAND MITIGATION PLANTING SCHEDULE

SPECIMEN	WETLAND STATUS	PLANT TYPE	PLANT SIZE	QUANTITY SITE 1	QUANTITY SITE 2	DENSITY/SPACING
SWEET PEPPERBUSH (CLETHRA ALNIFOLIA)	FAC	SHRUB	18-24 INCHES	18	18	5-8 FT. ON CENTER
SPECKLED ALDER (ALNUS INCANA)	FACW	SHRUB	18-24 INCHES	12	21	7-8 FT. ON CENTER
HIGHBUSH BLUEBERRY (VACCINIUM CORYMBOSUM)	FACW	SHRUB	18-24 INCHES	8	15	5-6 FT. ON CENTER
SOUTHERN ARROWWOOD (VIBURNUM DENTATUM)	FAC	SHRUB	18-24 INCHES	12	21	5-8 FT. ON CENTER
WETLAND SEED MIX (*1)	---	HERBACEOUS				1 LB./2500 SF

(*1) WETLAND SEED MIX: "NEW ENGLAND WETMIX" FROM NEW ENGLAND WETLAND PLANTS, INC. OR SIMILAR. TYPICAL SPECIES: FOX SEDGE (CAREX VULPINOIDEA), SALLOW SEDGE (CAREX LURIDA), BROOM SEDGE (CAREX SCOPARIA), SENSITIVE FERN (ONOCLEA SENSIBILIS), BLUE VERVAIN (VERBENA HASTATA), HOP SEDGE (CAREX LUPULINA), DARK-GREEN BULRUSH (SCIRPUS ATROVIRENS), NODDING BUR-MARIGOLD (BIDENS CERNUA), BRISTLY SEDGE (CAREX COMOSA), FRINGED SEDGE (CAREX CRINITA), TALL MANNAGRASS (GLYCERIA GRANDIS), WOOL-GRASS (SCIRPUS CYPERINUS), SOFT RUSH (JUNCUS EFFUSUS), SPOTTED JOE-PYE-WEED (EUTROCHIUM MACULATUM), BONESET (EUPATORIUM PERFOLIATUM), AMERICAN WATER-PLANTAIN (ALISMA SUBCORDATUM), NEW ENGLAND ASTER (SYMPHYOTRICHUM NOVAE-ANGLIAE), RATTLESNAKE MANNAGRASS (GLYCERIA CANADENSIS), PURPLE-STEM ASTER (SYMPHYOTRICHUM PUNICEUM), SOFT-STEMMED BULRUSH (SCHOENOPLECTUS TABERNAEMONTANI), BLUEFLAG (IRIS VERSICOLOR), SWAMP MILKWEED (ASCLEPIAS INCARNATA), AND ALLGHENY MONKEY-FLOWER (MIMULUS RINGENS).

WETLAND SEED MIX TO BE APPLIED TO WETLAND CREATION AND RESTORATION AREAS.



DRACUT SITE LOCUS

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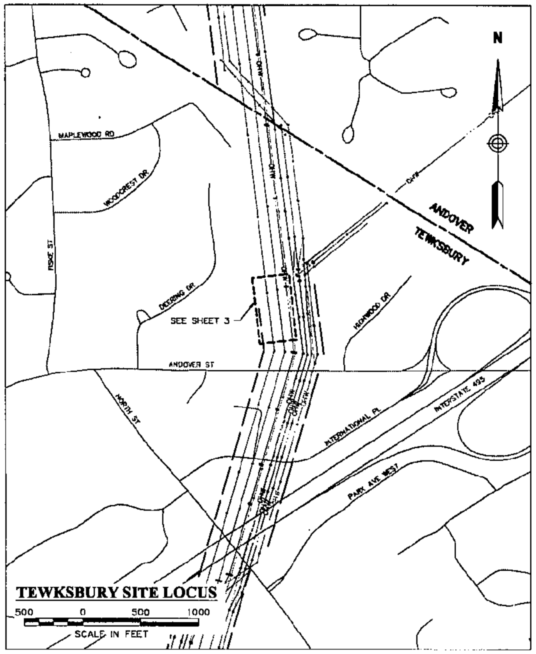
SCALE IN FEET



TEWKSBURY SITE LOCUS

500 0 500 1000
SCALE IN FEET

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Notes and Overview

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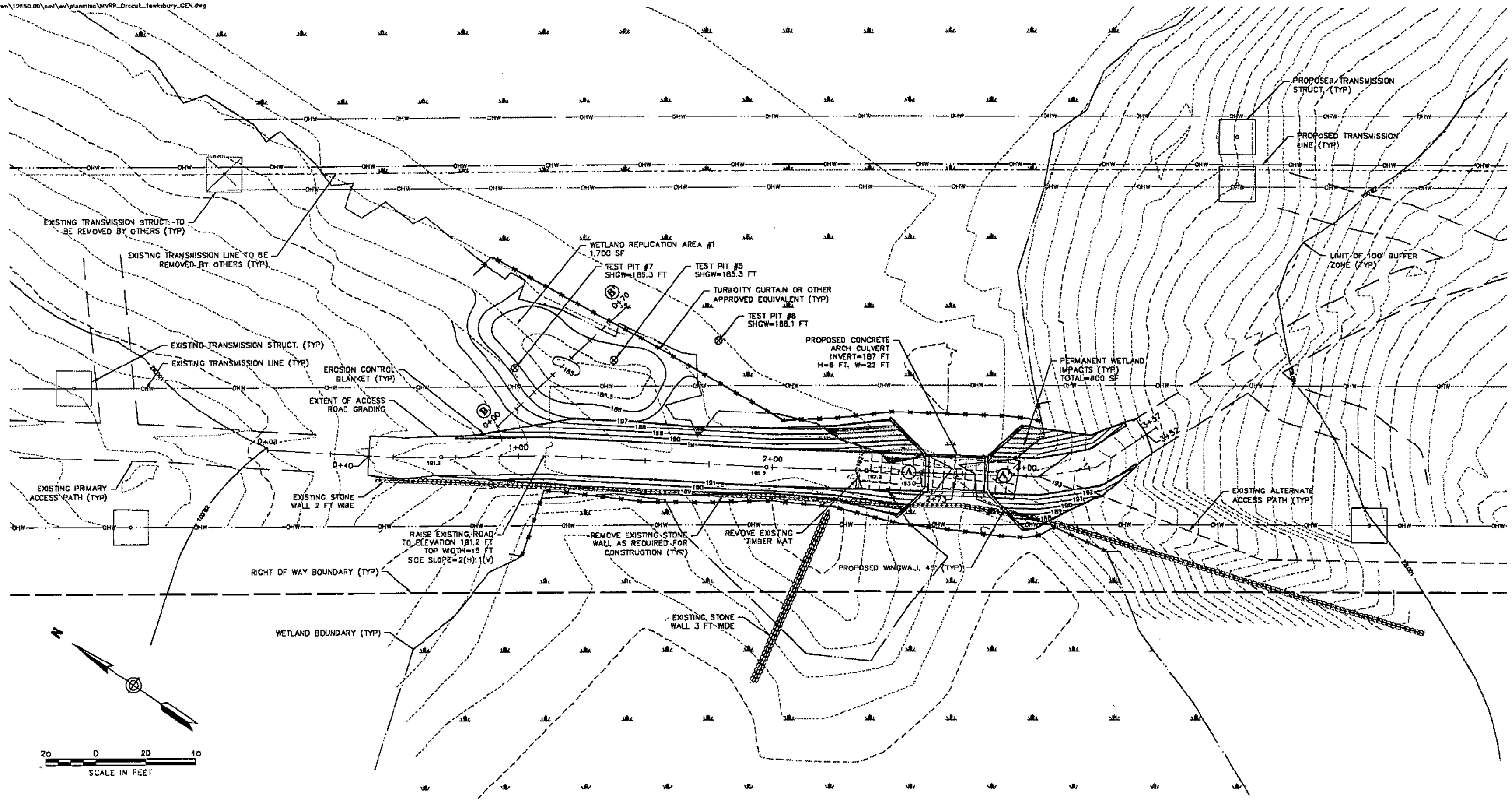
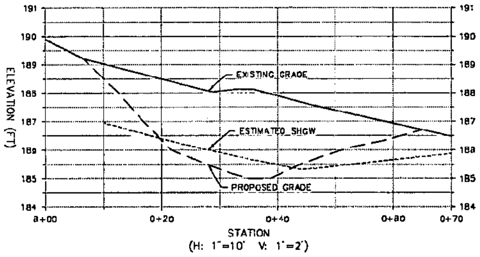

PROPOSED TRANSMISSION STRUCT. (TYP)
PROPOSED TRANSMISSION LINE (TYP)
LIMIT OF 100' BUFFER ZONE (TYP)
EXISTING TRANSMISSION STRUCT. TO BE REMOVED BY OTHERS (TYP)
EXISTING TRANSMISSION LINE TO BE REMOVED BY OTHERS (TYP)
WETLAND REPLICATION AREA #1 1,700 SF
TEST PIT #7 SHGW=185.3 FT
TEST PIT #5 SHGW=185.3 FT
TURBIDITY CURTAIN OR OTHER APPROVED EQUIVALENT (TYP)
TEST PIT #6 SHGW=186.1 FT
PROPOSED CONCRETE ARCH CULVERT INVERT=187 FT H=6 FT, W=22 FT
PERMANENT WETLAND IMPACTS (TYP) TOTAL=800 SF
EXISTING TRANSMISSION STRUCT. (TYP)
EXISTING TRANSMISSION LINE (TYP)
EROSION CONTROL BLANKET (TYP)
EXTENT OF ACCESS ROAD GRADING
EXISTING PRIMARY ACCESS PATH (TYP)
EXISTING STONE WALL 2 FT WIDE
RAISE EXISTING ROAD TO ELEVATION 191.2 FT TOP WIDTH=15 FT SIDE SLOPE=2(H):1(V)
REMOVE EXISTING STONE WALL AS REQUIRED FOR CONSTRUCTION (TYP)
REMOVE EXISTING TIMBER MAT
PROPOSED WINGWALL 45° (TYP)
EXISTING ALTERNATE ACCESS PATH (TYP)
RIGHT OF WAY BOUNDARY (TYP)
WETLAND BOUNDARY (TYP)
EXISTING STONE WALL 3 FT WIDE
OHW
0+00
0+40
0+70
1+00
2+00
3+00
3+57
B
A
N
20 0 20 40
SCALE IN FEET



Section B-B': Wetland Replication Area 1

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Dracut Site Plan

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2 of

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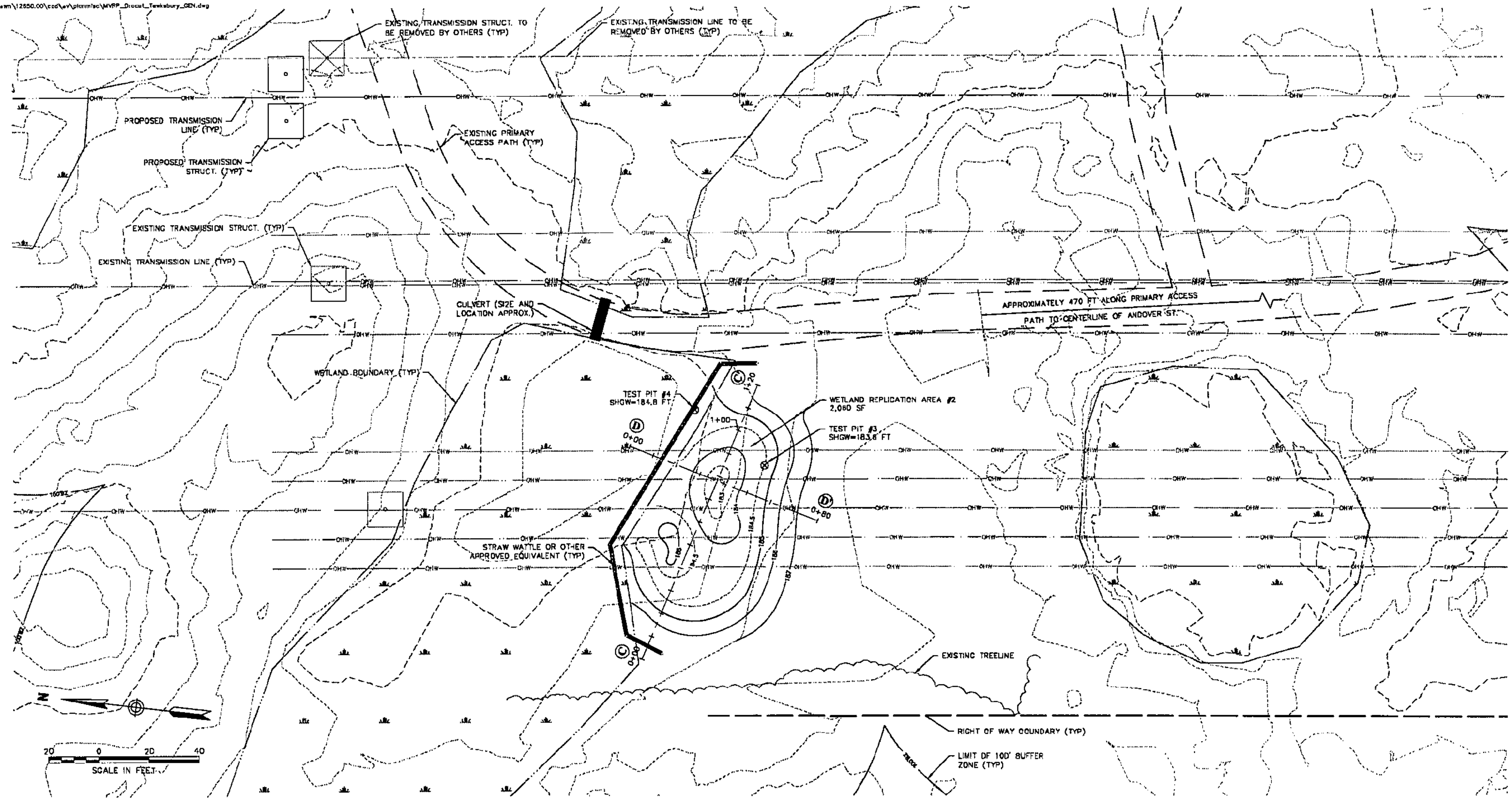
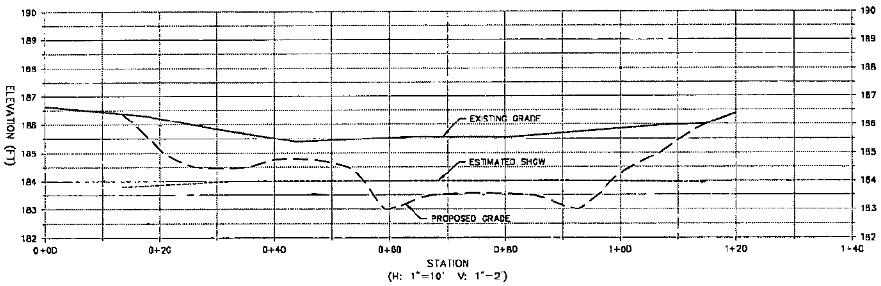
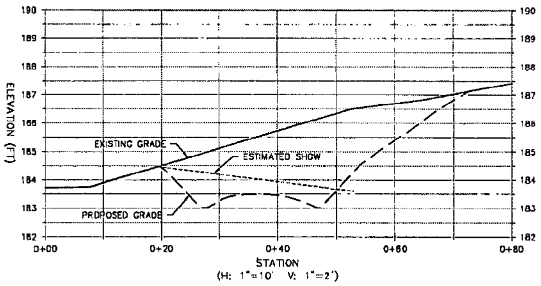

EXISTING TRANSMISSION STRUCT. TO BE REMOVED BY OTHERS (TYP)
EXISTING TRANSMISSION LINE TO BE REMOVED BY OTHERS (TYP)
PROPOSED TRANSMISSION LINE (TYP)
PROPOSED TRANSMISSION STRUCT. (TYP)
EXISTING PRIMARY ACCESS PATH (TYP)
EXISTING TRANSMISSION STRUCT. (TYP)
EXISTING TRANSMISSION LINE (TYP)
CULVERT (SIZE AND LOCATION APPROX.)
APPROXIMATELY 470 FT ALONG PRIMARY ACCESS PATH TO CENTERLINE OF ANDOVER ST.
WETLAND BOUNDARY (TYP)
TEST PIT #4 SHGW=184.8 FT
WETLAND REPLICATION AREA #2 2,080 SF
TEST PIT #3 SHGW=183.6 FT
C 1+20
1+00
D 0+00
D' 0+80
C' 0+00
183
183.5
184
184.5
185
187
STRAW WATTLE OR OTHER APPROVED EQUIVALENT (TYP)
EXISTING TREELINE
RIGHT OF WAY BOUNDARY (TYP)
LIMIT OF 100' BUFFER ZONE (TYP)
OHW
N
20 0 20 40
SCALE IN FEET



Section C-C': Wetland Replication Area 2



Section D-D': Wetland Replication Area 2

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Tewksbury Site Plan

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3 of

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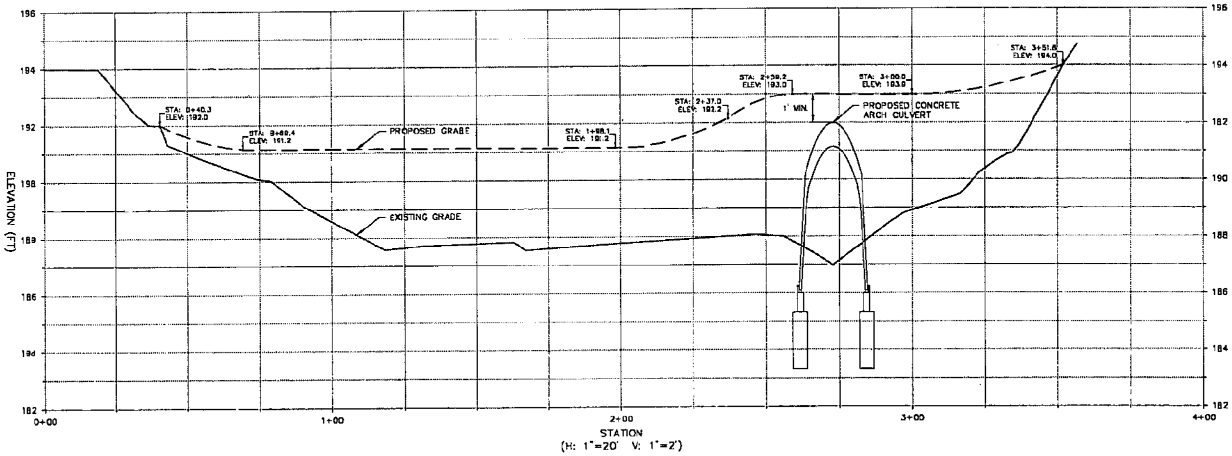

Access Road Profile

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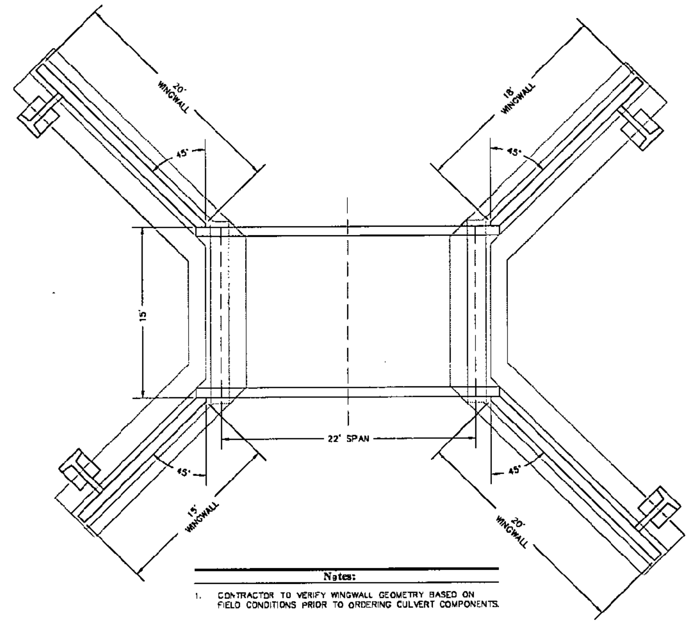
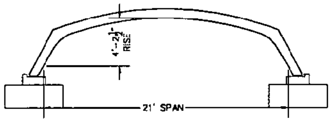


Notes:

1. CONTRACTOR TO VERIFY WINGWALL GEOMETRY BASED ON FIELD CONDITIONS PRIOR TO ORDERING CULVERT COMPONENTS.

Plan View: O-Series Culvert with Wingwalls

N.T.S.



Section A-A': O-Series Culvert and Backfill

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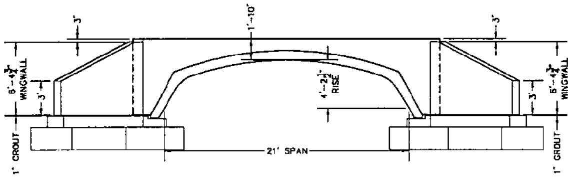

Front View: O-Series Culvert with Wingwalls

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Culvert Details and Access Road Profile

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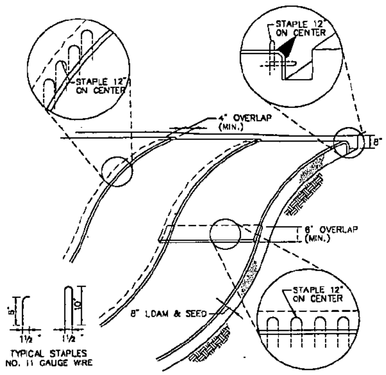
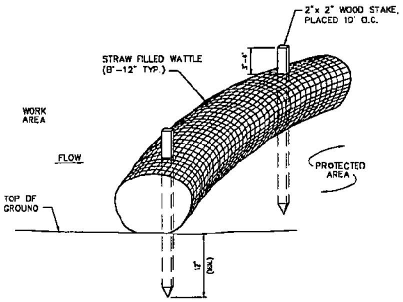


Notes:

1. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" DEEP TRENCH BACKFILL AND COMPACT TRENCH AFTER STAPLING.
2. ROLL THE BLANKET DOWN THE SWALE IN THE DIRECTION OF THE WATER FLOW.
3. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
4. WHEN BLANKETS MUST BE SPLICED DOWN THE SWALE, PLACE UPPER BLANKET END OVER LOWER END WITH 6 INCH (MIN.) OVERLAP AND STAPLE BOTH TOGETHER.
5. METHOD OF INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS.
6. EROSION CONTROL BLANKETS SHALL BE USED IN ALL AREAS WHERE SLOPES EXCEED 3:1.

Erosion Control Blanket Slope Installation

N.T.S. Source: VHB

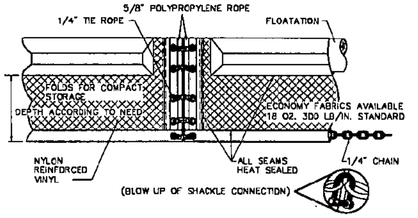

2"x 2" WOOD STAKE, PLACED 10' O.C.
STRAW FILLED WATTLE (8"-12" TYP.)
3"-4"
WORK AREA
FLOW
PROTECTED AREA
TOP OF GROUND
12" (MIN.)

Notes:

1. STRAW WATTLE SHALL BE AS MANUFACTURED BY EARTHSAVER OR APPROVED EQUAL.
2. STRAW WATTLES SHALL OVERLAP A MINIMUM OF 12 INCHES.
3. STRAW WATTLE SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.
4. TEMPORARY STRAW WATTLES TO BE REMOVED BY CONTRACTOR. ALL OTHERS TO REMAIN IN PLACE UNLESS DIRECTED OTHERWISE BY ENGINEER.
5. IF NON BIODEGRADABLE NETTING IS USED THE NETTING SHALL BE COLLECTED AND DISPOSED OF OFFSITE.

Straw Wattle - Erosion Control Barrier

N.T.S. Source: VHB



Turbidity Curtain

N.T.S. Source: VHB

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Attachment D

Merrimack Valley Reliability Project

Tewksbury, Andover, Dracut, Massachusetts

Wildlife Habitat Evaluation

Wildlife Habitat Evaluation

New England Power Company Merrimac Valley Reliability Project

Tewksbury, Andover, and Dracut, Massachusetts

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1

Introduction

Consistent with the Scope for the Final Environmental Impact Report (FEIR) issued by the Secretary of Energy and Environmental Affairs for New England Power Company's ("NEPCO") d/b/a National Grid, Merrimac Valley Reliability Project (MVRP or Project), the following are the findings of a Wildlife Habitat Evaluation completed at wetland resource areas affected by the Project.

The Massachusetts Wetlands Protection Act Regulations (the Regulations) generally requires that Wildlife Habitat Evaluations be conducted when a proposed project will alter certain wetland resource areas (Inland Bank, Bordering Vegetated Wetland, Land Under Water, Riverfront Area or Land Subject to Flooding) beyond established thresholds identified in the Regulations [310 CMR 10.60(1)]. Cumulatively, wetland resource impacts for the MVRP are greater than those typically allowed for these wetland resource areas in their respective performance standards in the Regulations. However, in accordance with 310 CMR 10.53 (3)(d), the Project qualifies as a "limited project" for the construction, reconstruction, operation and maintenance of underground and overhead public utilities, such as transmission lines. For a "limited project" typically, the completion of a Wildlife Habitat Evaluation may or may not be required at the discretion of the issuing authority.

The following detailed Wildlife Habitat Evaluation has been completed following the "Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands "(DEP 2006) (the Guidance). This Wildlife Habitat Evaluation will be submitted to the Tewksbury, Andover and Dracut Conservation Commissions and the Department of Environmental Protection (MADEP) as an Appendix to the Notice of Intents that will be submitted to the towns for the Project.

The Objectives of the Wildlife Habitat Evaluation are;

- to document the presence of "important wildlife habitat features" present within wetland resource areas that will be affected by the Project;
- and to identify potential adverse impacts to "important wildlife habitat features" that will result from construction of the Project.

Information provided in this document includes the following:

- an overview of the Project,
- a summary of the Wildlife Habitat Evaluation methodology employed,
- a description of the existing wetland found on the Project Site,
- descriptions of the types of impacts that will result from the Project,
- a summary of habitat conditions found within impact areas,

- a listing of important habitat features found within areas of wetland resource impact,
- an analysis of potential adverse effects resulting from the Project,
- proposed mitigation measures to offset impacts.

2

Project Overview

The Project involves the construction of a new 345 kV electric transmission line ("Line 3124") within an existing right-of-way ("ROW") between the Tewksbury 22A Substation in Tewksbury, Massachusetts and the Public Service of New Hampshire-owned Scobie Pond Substation in Londonderry, New Hampshire. The installation of this new line will help to relieve potential contingency overloads under various conditions on several elements of the area's transmission system. In doing so, the MVRP ensures continued compliance with all applicable federal and regional transmission system reliability standards and criteria, and maintains reliable electric service to customers in the area.

The Project in Massachusetts is 6.5 miles long, occurring in the Towns of Tewksbury, Andover, and Dracut. There are five existing transmission lines located within this ROW (one 345 kV line, two 230 kV lines and two 115 kV lines).

The portion of the Project located in Massachusetts begins at the Tewksbury #22A Substation in Tewksbury, Massachusetts, and continues northward for 6.5 miles in an existing ROW (sometimes referred to as "the Fifteen Mile Falls ROW") to the Massachusetts/New Hampshire border in Dracut, Massachusetts (Figure 1, Appendix A). There are up to five existing transmission lines within this NEP-owned segment of the Fifteen Mile Falls ROW, including one 345 kV line, two 230 kV lines, and two 115 kV lines. In some locations a distribution circuit is also located within the ROW. The arrangement of existing facilities along the ROW varies over the 6.5 miles.

The proposed configuration of the new 3124 Line and the existing lines will vary across the width of the ROW. In some sections Line 3124 will be built on newly constructed structures; in other sections one or more of the existing lines will be relocated on new structures and one of the existing lines will be reassigned as Line 3124. New or relocated structures will include wooden H-frame, steel lattice tower and single pole structures. Depending on the structure type, structures will be direct embedded or constructed on caisson foundations.

The MVRP also includes reconductoring of the 115 kV Y-151 Line within the same ROW. This component of the Project will replace that transmission line with larger capacity conductors between a location just north of Wheeler Road in Dracut, Massachusetts, referred to as Dracut Junction, and the point of ownership transfer between NEPCO and Eversource in Hudson, New Hampshire. The need to upgrade to the regional transmission system is necessary and is independent of the need to build the 3124 Line. Because the Y-151 Line and the 3124 Line occupy the same ROW, the work associated with each line will be accomplished concurrently.

The width of the project ROW varies from 225 to 520 feet wide. In most locations, the ROW is cleared to nearly its full extent, with upland and wetland areas maintained in accordance with NEPCO's Vegetation Management Plan. Wetlands within the ROW generally consist of shrub and herbaceous vegetation communities, with a relatively small area of forested wetlands along unmaintained borders of the ROW. The Project crosses the Merrimack River, Nickel Mine Brook, Trout Brook, two other unnamed perennial streams, and five unnamed intermittent streams.

Land uses adjacent to the ROW include forested areas, wetlands, open fields, and a mix of commercial/industrial and residential areas. The ROW crosses several local and state roadways, including Interstate-495. North of the Merrimack River in Dracut, portions also pass through active and inactive sand pits and gravel yards.

3

Evaluation Methodology

Because of the large nature of the project, the presence of "Habitats of Potential Regional and Statewide Significance", two discrete areas of known Priority and Estimated Habitats identified by NHESP, and two certified and one potential certified vernal pool on the Project ROW (Figure 2, Appendix A), detailed habitat evaluations were completed at each location along the Project where wetland resources would be affected by construction activities. These evaluations collected data that are listed on the Appendix B forms provided in the Guidance.

Prior to visiting the project site, the extent of potential wetland resource impacts were identified on project plans (Appendix B). Wetland impacts included the conversion of forested wetland areas to scrub-shrub and/or emergent vegetation communities, the temporary disturbance of wetland resources by means of the placement of swamp mats for access and work pads, and the placement of utility structures. Wetland resource areas where wildlife habitat impacts were evaluated included bordering vegetated wetland (BVW), riverfront area (RFA), and bordering land subject to flooding. Impacts to bank and land under waterways/waterbodies are not expected to occur because stream spanning construction techniques will be used so that construction equipment can cross above waterbodies avoiding impact. A summary of total impacts that will occur along the project length are summarized by town in Table 1 below.

Table 1 MVRP Total Wetland Impacts Summary

Town	BVW (sf)	RFA (sf)	Bordering Land Subject to Flooding (sf)
Dracut	128,358	73,866	365
Andover	305	-	-
Tewksbury	548,681	-	131,062
Total (sf)	677,343	73,866	131,427
Total (ac)	15.5	1.7	2.9

To facilitate location of wetland resource impact areas on the project site, GIS shapefiles of these areas were created and uploaded to Trimble® GPS units for use in the field. In total 59 impact locations were identified. As a means to record habitat observations at each wetland impact area, a data dictionary was created and uploaded to the GPS unit. The data inputs programed into the data dictionary included all of the information that would be recorded on the field data forms provided in Appendix B of the Guidance.

Wildlife habitat evaluations were completed on the Project site from September 17, 2015 to October 14, 2015. At that time each wetland impact area along the length of the Project was visited and wildlife habitat data collected there. Following completion of the field evaluations the collected data was downloaded and used to develop summary tables that list the collected data. These tables are provided in Appendix C.

During the site visits general observations were also made of vegetation, soil conditions and the presence of wildlife or wildlife signs when seen. These observations were recorded on data forms provided in Appendix D. Representative photographs were also taken at each impact location. These are provided in Appendix E.

4

Existing Wetland Resources

The following are descriptions of the types of wetland resource areas identified within and adjacent to the Project corridor. This discussion also briefly identifies the 59 wetland resource Impact Areas, as shown on Project Plan figures provided in Appendix B.

4.1 Bordering Vegetated Wetland (310 CMR 10.55)

According to the Regulations [310 CMR 10.55(1)], "Bordering Vegetated Wetlands are likely to be significant to the protection of fisheries and to wildlife habitat" because they "provide important food, shelter, migratory and overwintering areas, and breeding areas for many birds, mammals, amphibians and reptiles."

Bordering Vegetated Wetlands (BVW) occur in various locations along the length of the Project corridor. The wetlands were field delineated in 2014. The delineation methodology that was followed was consistent with the methodologies described in the Massachusetts Department of Environmental Protection's 1995 manual titled "Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act," the 1987 Corps of Engineers Wetland Delineation Manual and the 2009 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. Concurrent with wetland delineation activities, the wetland boundaries were recorded with Trimble® GPS units capable of sub-meter accuracy.

BVW on the Project site consist of three general wetland community types based on the U.S. Fish and Wildlife's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et. al, 1979).

4.1.1 Palustrine Forested (PFO)

Narrow bands of palustrine forested wetlands ("PFO") occur along the unmaintained borders of the ROW. These areas typically extend into larger forested wetland systems beyond the ROW boundary.

Dominant plant species within these forested wetlands include: red maple (*Acer rubrum*), white pine (*Pinus strobus*), American elm (*Ulmus americana*), speckled alder (*Alnus incana*), highbush blueberry (*Vaccinium corymbosum*), glossy buckthorn (*Frangula alnus*), winterberry (*Ilex verticillata*), southern arrowwood (*Viburnum dentatum*), silky dogwood (*Cornus amomum*), cinnamon fern (*Osmundastrum cinnamomeum*), sensitive fern (*Onoclea sensibilis*), soft rush (*Juncus effusus*), various sedge species (*Carex spp.*), and sphagnum moss (*Sphagnum spp.*).

Table 2 lists each wetland area for which portions may be classified as PFO along with the associated sheet number on the plan set (Appendix B).

Table 2 Forested Wetland on the Project Corridor

Wetland Impact Area	Wetland Area	Plan Sheet No.	Town
9	WA23	25, 24	Dracut
17	WA17A	23	Dracut
18	Trout Brook RFA	23	Dracut
42	WA7	8	Tewksbury
55	WA1	2, 3	Tewksbury

4.1.2 Scrub-Shrub (PSS)

The majority of the wetland systems within the ROW can be characterized as palustrine scrub-shrub wetlands ("PSS"). These wetlands occur within the maintained portions of the ROW.

Dominant species within PSS include speckled alder, highbush blueberry, glossy buckthorn, maleberry (*Lyonia ligustrina*), silky dogwood, southern arrowwood, multiflora rose (*Rosa multiflora*), meadowsweet (*Spiraea alba*), steeplebush (*Spiraea tomentosa*), sheep laurel (*Kalmia angustifolia*), cinnamon fern, sensitive fern, numerous species of goldenrods (*Solidago spp.*), sedges (*Carex spp.*) and rushes (*Juncus spp.*), purple loosestrife (*Lythrum salicaria*), cattail (*Typha spp.*), common reed (*Phragmites australis*), common cinquefoil (*Potentilla simplex*), swamp dewberry (*Rubus hispidus*), greenbrier (*Smilax spp.*), and poison ivy (*Toxicodendron radicans*).

Table 3 lists each wetland system for which portions may be classified as PSS, along with the associated sheet number on the plan set. In some situations some of these wetlands may contain significant components of palustrine emergent (PEM) wetland such that it was difficult to determine dominate wetland class. In these situations the wetlands were classified as PSS/PEM. Table 3 lists each wetland system for which portions may be classified as PSS or PSS/PEM along with the associated sheet number on the plan set (Appendix B).

Table 3 Scrub-Shrub Wetland on the Project Corridor

Wetland Impact Area	Wetland Area	Plan Sheet No.	Town
3	WA28	28	Dracut
4	WA28	28	Dracut
5	WA26	27, 26	Dracut
6	WA26	27, 26	Dracut
7	WA24	25	Dracut
8	WA23	25	Dracut
10	WA23	25, 24	Dracut
11	WA20	24	Dracut
12	WA18A and WA18B	24	Dracut
13	WA19	23	Dracut
14	WA18	23	Dracut
16	WA17A	23	Dracut
21	WA17	23	Dracut
22	WA17	23	Dracut
32	WA15A	18	Dracut
34*	WA13	16, 14	Dracut
37*	WA7B	9	Tewksbury
38*	WA7B	9, 8	Tewksbury
39	WA7C	8	Tewksbury
40	WA7	8	Tewksbury
43	WA7	8	Tewksbury
44	WA4	8, 7	Tewksbury
45	WA1C	6	Tewksbury
46	WA1A	6	Tewksbury

*Wetland classified as PSS/PEM

4.1.3 Palustrine Emergent (PEM)

There are a number of palustrine emergent marshes ("PEM") within the maintained portion of the ROW. In some cases these systems extend off the ROW as part of a larger wetland system.

Dominant species within PEM include cattail, woolgrass (*Scirpus spp.*), goldenrods (*Solidago spp.*), sedges (Carex spp.) and rushes (*Juncus spp.*), purple loosestrife, common reed, sensitive fern, cinnamon fern, and sphagnum moss.

Table 4 lists each wetland system for which portions may be classified as PEM, along with the associated sheet number on the plan set. In some situations some of the wetlands contained significant components of palustrine scrub-shrub (PSS) wetland such that it was difficult to determine dominate wetland class. In these situations the wetlands were classified as PSS/PEM. Table 4 lists each wetland system for which portions may be classified as PEM or PSS/PEM, along with the associated sheet number on the plan set (Appendix B).

Table 4 Emergent Wetland on the Project Corridor

Wetland Impact Area	Wetland Area	Plan Sheet No.	Town
1	WA29	29	Dracut
2	WA20	20	Dracut
15	WA17A	23	Dracut
28	WA17	22	Dracut
29	WA16	21	Dracut
30	WA16	21	Dracut
31	WA16	21	Dracut
34*	WA13	16, 14	Dracut
37*	WA7B	9	Tewksbury
38*	WA7B	9, 8	Tewksbury
41	WA7	8	Tewksbury
47	WA1A	6	Tewksbury
48	WA1A	4, 5	Tewksbury
49	WA1A	4, 5	Tewksbury
50	WA1A	5, 4, 3	Tewksbury
51	WA1A	3	Tewksbury
52	WA1A	3	Tewksbury
54	WA1	3	Tewksbury
56	WA1	3, 2, 1	Tewksbury
57	WA1	2	Tewksbury

*Wetland classified as PSS/PEM

4.2 Bordering Land Subject to Flooding (310 CMR 10.57)

Bordering Land Subject to Flooding (BLSF) (100-year Floodplain) on the MVRP Project area was determined from MassGIS information derived from Flood Insurance Rate Maps (FIRMs) published by FEMA. The MVRP Project area crosses three areas mapped as 100-year flood zones. Table 5 lists each BLSF area crossed by the project along with the associated sheet number on the plan set (Appendix B). Areas of RFA that include upland portions are also noted in the table.

Table 5 Bordering Land Subject to Flooding on the Project Corridor

Wetland Impact Area	Wetland Area	Plan Sheet No.	Town
32	WA15A	18	Dracut
53*	-	3	Tewksbury
54, 54a, 55	WA1	3	Tewksbury
55, 56, 57	WA1	2	Tewksbury

* Includes upland areas.

4.3 Bank (310 CMR 10.54) and Land Under Waterbodies and Waterways (LUW) (310 CMR 10.56)

A number of wetland areas on the ROW have streams or rivers flowing through them. These systems range from intermittent to perennial in nature and many have wetlands associated with their boundaries.

Table 6 lists each wetland system for which portions contain either perennial or intermittent streams and associated Bank and LUW. The associated plan sheet numbers are also provided for the plan set provided in Appendix B. Impact areas where only tree clearing will occur are noted.

Table 6 Bank and LUW along Project the Corridor

Wetland Impact Area	Associated Wetland ID	Stream Area ID	Name (Perennial/Intermittent)	Plan Sheet. No.	Town
17*	WA17A	SA9	Unnamed Tributary of Trout Brook (I)	23	Dracut
22	WA17	SA8	Trout Brook (P)	23	Dracut
32	WA15A	SA7	Unnamed (P)	18	Dracut
34	WA13	SA5	Unnamed Tributary of Mine Brook (I)	16	Dracut
37	WA7B	SA3	Unnamed (I)	9	Tewksbury
38, 40	WA7B	SA3	Unnamed	8	Tewksbury
41,42*, 43	WA7, 7A	SA2	Unnamed (I)	8	Tewksbury
46	WA1A,C	SA1	Unnamed (I)	6	Tewksbury

* Tree clearing in these areas only.

4.4 Riverfront Area (RFA) (310 CMR 10.58)

Several of the streams crossed by the Project ROW are perennial and have associated Riverfront Area (RFA). Portions of RFA may either be wetland, upland, or both.

Table 7 lists Wetland Impact Areas where riverfront area on the project ROW will be disturbed by some form of disturbance. Areas of RFA that include upland portions are noted in the table along with the associated sheet number on the plan set (Appendix B).

Table 7 Riverfront Area along the Project Corridor

Wetland Impact Area	Associated Wetland ID	Stream Area ID	Associated Stream	Plan Sheet. No.	Town
18*, 19*, 20*,21,22, 23*,24*,25*,	WA17	SA-8	Trout Brook	23	Dracut
24*, 25*, 26*, 27*	WA17	SA8	Trout Brook	22	Dracut
32* 33*	WA15A	SA7	Unnamed (P)	18	Dracut

* Includes upland areas.

4.5 Vernal Pools

Two Certified Vernal Pools were identified on the Project ROW using MassGIS mapping. A comprehensive vernal pool survey, for the ROW, was conducted in the spring of 2015. Both of these Certified Vernal Pools are in Dracut and were confirmed during this effort. One of these areas is associated with Wetland 14 and is located within a large depression west of a rock quarry operation north of Methuen Street (Sheet 17 in Appendix B). The other is located in Wetland 21 just north of Broadway Road/Route 113 (Sheet 24 in Appendix B). An additional certifiable pool was identified within Wetland 11A (Sheet 12 in Appendix B) south of River Road in Andover.

A Potential Vernal Pool was identified by MassGIS mapping in Dracut in Wetland 17 (Sheet 22 in Appendix B). Based on the vernal pool survey conducted during the spring of 2015, fish were found in this area discounting it as a certifiable vernal pool.

4.6 Protected Species

According to information provided by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), the MVRP ROW crosses two areas of mapped protected species habitat. These areas include Priority (PH)/Estimated Habitats (EH), PH 1321/EH65 and PH 678/EH 636. Both of these areas are shown on Figure 2 provided in Appendix A and the Project Plans provided in Appendix B.

PH 1321/EH65 is located north of River Road in Andover and includes areas both to the north and south sides of the Merrimack River at the Andover/Dracut town line. This area is shown on sheets 12 and 13 of the project plans provided in Appendix B.

PH 678/EH 636 is located north of Methuen Street in Dracut. This area is shown on sheets 16 -18 of the project plans provided in Appendix B.

The rare species that are mapped within these polygons are identified in Table 8 below.

Table 8 Rare Species Mapped within the MVRP ROW

PH/EH	Taxonomic Group	State Status	Town
PH1321/EH65	Bird	Threatened	Andover/Dracut
	Insect	Special Concern	Andover/Dracut
PH678/EH636	Amphibian	Special Concern	Dracut
	Reptile	Special Concern	Dracut

5

Wildlife Habitat

To identify important wildlife habitat features in locations where wetland resource impacts will likely occur, each of the 59 Impact Areas were visited once between September 17th and October 14th of 2015. Detailed listings of important wildlife habitat features identified within these impact areas are discussed below. Table 9 provided in Appendix C provides a summary of basic information for each of the impact areas including Massachusetts Wetland Protection Act resource types, US Fish and Wildlife Service (USFWS) wetland classification, vegetation cover, USFWS hydrology, and inclusion within a mapped Habitat of Potential Regional or Statewide Importance.

Listings of important wildlife habitat and contextual habitat features are summarized in Tables 10-17 provided in Appendix C. Completed field sheets listing general observations including plant species and wildlife observation noted in each location are provided in Appendix D. Photographs at each wetland are provided in E of this document.

5.1 Important Habitat Features

The majority of the wetland resource impacts are temporary in nature and will occur on the maintained portion of the ROW. However other impacts will occur on forested portions of the unmaintained segments of NEPCOs ROW. Those impacts will result in the conversion of forested wetland to that of scrub-shrub and/or emergent wetlands.

The diverse vegetation and structural habitat features found in wetlands on the Project site are likely to provide feeding, breeding, nesting, and cover for a variety of wildlife species. Important wildlife habitat characteristics found within some of the wetland impact areas on the Project site include:

- Upland/wetland food plants (hard mast and fruit)
- Standing dead trees (snags)/tree cavities
- Small mammal burrows
- Dense herbaceous cover
- Large woody debris on the ground
- Rock Piles, Crevices, Logs, Vegetation and Hummocks under, at or overhanging the Water's Surface
- Depressions that may serve as seasonal pools and Standing Water present at least part of the growing season
- Emergent wetlands

Descriptions of important wildlife habitat features identified within Project wetland impact areas are provided below.

5.1.1 Upland/Wetland Food Plants (hard mast and fruit/berry producers)

A variety of trees and shrubs provide fruits, nuts, seeds, buds, foliage, and insects as food for wildlife (Martin et al 1961; DeGraaf and Rudis 1983).

Important upland/wetland wildlife food plants noted within some of the wetland impact areas on the project site include; northern arrowwood (*Viburnum dentatum*), wild raisin (*V. cassinoides*), oaks (*Quercus spp.*), brambles (*Rubus spp.*), grapes (*Vitis sp.*), black huckleberry (*Gaylussacia baccata*), American hazelnut (*Corylus americana*), winterberry holly (*Ilex verticillata*), highbush blueberry (*Vaccinium* corymbosum) and silky dogwood (*Cornus ammomum*).

Other food producing plants found on some of the impact areas include

The fruits of high-bush blueberry are generally valued by a variety of birds, mammals, and reptiles. Brambles are considered an important food source for deer in spring, and its fruits are often consumed by skunks, rabbits, and some birds and reptiles. Common winterberry fruits serve as a winter food supply for many birds and mammals. The availability of common winterberry fruit is most important during the winter when other food sources are scarce (Martin et al 1961; DeGraaf and Rudis 1983).

Food availability present within Wetland Impact Areas is summarized in Table 10 provided in Appendix C. Wetland Impact areas that contained plants that provide important food for wildlife include:

Dracut: IA2, IA5, IA6, IA7, IA8, IA9, IA11, IA18, IA19, 1A20, IA22, IA23, IA24, IA25, IA26, IA27, IA28, IA30, IA33, IA34

Andover: NA

Tewksbury: IA36, IA37, IA38, IA39, IA40, IA41, IA42, IA43, IA44, IA46, IA48, IA50, IA51, IA53, IA54, IA55, IA57

Field data sheets provided in Appendix D provide a listing of plant species including important food plants commonly found within wetland impact areas.

5.1.2 Shrub Thickets or Stream Beds with a Presumed Abundance of Earth Worms

Dense shrub thickets adjacent to stream beds with an abundance of earth worms were not found in any of the wetlands along the project ROW.

5.1.3 Veery Nesting Habitat

The veery (*Catharus fuscescens*) is an inhabitant of damp forests and in New England it is known to inhabit shrub thickets. Key vegetation factors in habitat selection seem to include dense shrub cover with herbaceous understory. They also seem to favor soils that are saturated or modernly dry to moist (Sousa, 1982).

Habitat suitable for veery were noted in the following impact areas:

- Dracut: IA3, IA4, IA5, IA6, IA7, IA8, IA10, IA11, IA12, IA13, IA14, IA15, IA16, IA20, IA21
- Andover: NA
- Tewksbury: IA36, IA37, IA38, IA39, IA40, IA41, IA43, IA44, IA46, IA50, IA54

5.1.4 Standing Dead Trees (or "Snags")/Tree Cavities

Standing dead trees (snags) are utilized by various wildlife species for feeding, nesting, denning, roosting, or perching. The larger diameter dead trees with cavities can serve as dens for raccoon (Procyon lotor), Virginia opossum (Didelphis virginiana), and fisher (Martes pennanti). Wood duck (Aix sponsa), common goldeneye (Bucephala clangula), hooded and common mergansers (Lophodytes spp.) are known to nest in large cavities in snags. Downy (Picoides pubescens), hairy (Picoides villosus), and pileated (Dryocopus pileatus) woodpeckers all feed heavily on wood-boring larvae of beetles and other insects and invertebrates found in snags. Woodpeckers are also the primary excavators of nesting cavities in snags which are later used by other species. Smaller snags provide feeding and/or nest sites for the black-capped chickadee, white-breasted nuthatch (Sitta carolinensis), tufted titmouse (Baeolophus bicolor), tree swallow (Tachycineta bicolor), and small mammals such as bats and squirrels (including flying squirrels). Birds of prey will use snags for perching while hunting or feeding (DeGraaf et al. 1992). Table 11 provided in Appendix C identifies wetland impact areas with standing dead trees and trees with cavities.

Number of live or dead trees over 3′ in diameter were noted in the following impact areas (the number of trees that fit this category are noted in parenthesis):

- Dracut: IA9 (2)
- Andover: NA
- Tewksbury: IA42 (2), IA50 (5), IA 53 (2), 55 (2)

Standing Dead Trees (or "Snags"), 6-12" dbh, were noted in the following impact areas (the number of dead standing trees that fit this category are noted in parenthesis):

- Dracut: IA9 (6), IA25 (1)
- Andover: NA
- Tewksbury: IA42 (13) IA48 (1), IA49 (5), IA51 (5), IA53 (6), IA55 (8), IA56 (55)

Standing Dead Trees (or "Snags"), 12-18" dbh, were noted in the following impact areas:

- Dracut: IA9 (4)
- Andover: NA
- Tewksbury: IA42 (5), IA55 (2)

Standing Dead Trees (or "Snags"), 18-24"" dbh, were noted in the following impact areas:

- Dracut: IA9 (3)
- Andover: NA
- Tewksbury: IA49 (6),

Standing Dead Trees (or "Snags"), 24" dbh, were noted in the following impact areas:

- Dracut: IA9 (2), IA25 (3)
- Andover: NA
- Tewksbury: NA

Tree Cavities 6-12" in diameter were noted in the following impact areas:

- Dracut: IA9 (48)
- Andover: NA
- Tewksbury: IA42 (8), IA48 (15), IA50 (7), IA51 (6), IA53 (2), IA55 (25)

Tree Cavities 12-18" in diameter were noted in the following impact areas:

- Dracut: NA
- Andover: NA

Tewksbury: IA42 (6), IA53 (1)

- Tree Cavities > 18" diameter were noted in the following impact areas:
- Dracut: NA
- Andover: NA
- Tewksbury: IA55 (1)

5.1.5 Small Mammal Burrows

Although not specifically observed during the field visits, the presence of small mammals within the vicinity of the Project corridor is considered to be abundant based on the landscape and habitat types present. Generally, the soils found within forested wetlands, adjacent uplands, scrub-shrub wetlands, and some of the emergent wetlands provide a good substrate for tunneling and burrowing. Small mammals such as the northern short-tailed shrew (Blarina bevicauda), white-footed mouse (Peromyscus leucopus), star nosed mole (Condylura cristata) and eastern chipmunk (Tamias striatus) feed on the abundant insects and herbaceous vegetation found in forested wetlands and nest either in burrows or in the ground litter (DeGraaf and Rudis 1983).

These small mammals serve as a forage base for larger carnivores such as coyotes, foxes, or birds of prey. They also help to disperse seeds through their fur, droppings or winter caches. The tunnels created by burrowing mammals help aerate soil and allow water to percolate through, making a more suitable place for seeds to take root. Small mammal waste deposited in burrows also fertilizes plant roots. Burrows also provide the base for underground nesting sites important to pollinating insects such as bumblebees. Mole salamanders (Ambystoma spp.) also use existing small mammal burrows outside of their breeding season (DeGraaf and Rudis 1983). Table 11 provided in Appendix C identifies wetland impact areas with small mammal burrows.

Small mammal burrows were noted in the following impact areas:

- Dracut: All
- Andover: All
- Tewksbury: All

5.1.6 Dense Herbaceous Cover Suitable for Small Mammals, Amphibians and Reptiles

Dense herbaceous cover may be provided by either native and/or invasive vegetative species. Some of the more common species identified within the Project site include common reed, skunk cabbage, cattail, cinnamon fern, sensitive fern, goldenrod mix, jewelweed, mixed grasses sedges and rushes, and wool grass (. Wetland and upland herbaceous habitats may provide cover, food and nesting areas for small mammals, amphibians, reptiles, and bird species. Table 11 provided in Appendix C identifies wetland impact areas with dense herbaceous cover.

Dense herbaceous cover suitable for small mammals, amphibians and reptiles was noted in the following impact areas:

- Dracut: IA1, IA2, IA7, IA8, IA20, IA21, IA22, IA27, IA28, IA29, IA30, IA31, IA32, IA33, IA34
- Andover: NA
- Tewksbury: IA36, IA37, IA38, IA39, IA40, IA41, IA43, IA44, IA45, IA46, IA47, IA48, IA49, IA50, IA51, IA52, IA54, IA56

5.1.7 Large Woody Debris on the Ground

Large diameter dead wood that has fallen to the ground (logs; also called "coarse woody debris") and smaller diameter branches and twigs that form mounds (a brush pile) provide unique habitat features for wildlife (DeGraaf et al. 1992).

Logs on the forest floor provide shelter for animals of many sizes, such as bear and wild turkey at the larger end of the spectrum, and mice, salamanders, toads, and frogs at the smaller end. The high humidity inside and beneath decaying logs offers beneficial conditions that help amphibians stay moist. The upper sides of logs are used by animals as platforms for basking in the sun. Small mammals such as voles and shrews use the interior of logs as nest sites and as places to hide from predators. In addition to shelter, logs provide food resources and may help animals navigate. The fungi, spiders, beetles, termites, ants, grubs, worms, snails, and slugs found inside rotting logs are food for animals such as salamanders, snakes, birds, mice, shrews, and bears (DeGraaf et al. 1992). Table 11 provided in Appendix C identifies wetland impact areas with large woody debris on the ground.

Large woody debris on the ground was noted within the following impact areas:

- Dracut: IA2, IA9, IA10, IA11, IA18, IA25
- Andover: NA
- Tewksbury: IA42, IA50, IA51, IA53, IA55, IA56

5.1.8 Rock Piles, Crevices, Logs, Vegetation and Hummocks Under, At or Overhanging the Water's Surface

Living and/or nonliving material that is located beneath the water's surface provides cover for aquatic and semi-aquatic wildlife species. Rocks and vegetative material at or within 1 meter of the water's surface provides an opportunity for herpetofauna to sunbath. Crevices in old rock walls and old stone culverts can provide cover for small mammals, reptiles, and some amphibians. Single large rocks or those piled in sunny spots are ideal for reptiles, amphibians, and butterflies. Chipmunks and other small rodents often utilize these hard, sun-warmed areas as well. Ant colonies can also thrive in them and provide food for a host of birds, mammals, reptiles, and amphibians. Live or dead vegetation that overhangs the water's surface provides a perch that offers good visibility for both predators and non-predators (DeGraaf and Rudis 1983). Table 11 provided in Appendix C identifies wetland impact areas with rock piles, crevices, logs, vegetation and hummocks under, at or overhanging the water's surface.

Rocks, crevices, logs, tree roots or hummocks under the water's surface (i.e., pools of standing water) were noted in impact areas:

- Dracut: IA28
- Andover: NA
- Tewksbury: IA42, IA55

Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (i.e., pools of standing water) were noted in impact areas:

- Dracut: IA21, IA28, IA32
- Andover: NA
- Tewksbury: IA37, IA41, IA42, IA55

Rock piles, crevices or hollow logs suitable for mink (*Mustela vison*) were noted in the following impact areas:

- Dracut: NA
- Andover: NA
- Tewksbury: IA55

Rock piles, crevices, hollow logs as dens for larger mammals

- Dracut: NA
- Andover: NA
- Tewksbury: NA

Live /dead standing vegetation overhanging water.

- Dracut: NA: IA9, IA30
- Andover: NA

Tewksbury: IA55, IA56

5.1.9 Depressions that May Serve as Seasonal Pools and/or Standing Water Present at Least Part of the Growing Season

Seasonal pools, often referred to as vernal (i.e. spring) pools in New England, provide habitat for many species of wildlife. They are filled with water in the spring and early summer and are usually completely dry by late summer. These seasonal pools typically hold water for more than 2 months of most years (Kenney and Burne 2009).

A rich food supply and lack of vertebrate predators make vernal pools and standing water that is present at least part of the growing season an important habitat for early breeding amphibians such as wood frogs (Rana sylvatica), spotted and blue-spotted salamanders (Ambystoma maculatum, A. laterale), and the marbled salamander (A. opacum). Vernal pools are also important habitat for various species of turtle, including the spotted turtle (Clemmys guttata), and Blanding's turtle (Emydoidea blandingii) (Kenney and Burne 2009).

Standing water present at least part of the growing season provides foraging, re-hydration and cover for breeding amphibians, non-breeding amphibians and turtles. The standing water benefits listed above also pertain to waterfowl, however, in addition to these, standing water present in the spring provides pair bonding habitat for many waterfowl species (DeGraaf and Rudis 1983). Table 11 provided in Appendix C identifies wetland impact areas with depressions that may serve as seasonal pools and/or standing water present at least part of the growing season.

Depressions that may serve as seasonal pools were noted in the following impact areas:

- Dracut: NA
- Andover: NA
- Tewksbury: IA42, IA55

Standing water present at least part of the growing season that provides breeding amphibian habitat was noted in impact areas:

- Dracut: IA1, IA9, IA15, IA28, IA30, IA31
- Andover: NA
- Tewksbury: IA37, IA48, IA49, IA50, IA51, IA54, IA55, IA56, IA57

Standing water present at least part of the growing season that provides non-breeding amphibian habitat was noted in impact areas:

- Dracut: IA1, IA9, IA15, IA18, IA28, IA29, IA30, IA31
- Andover: NA
- Tewksbury: IA37, IA38, IA40, IA41, IA42, IA43, IA44, IA46, IA47, IA48, IA49, IA50, IA51, IA52

Standing water present at least part of the growing season that provides turtle habitat was noted in impact areas:

- Dracut: IA1, IA18, IA28, IA29, IA30, IA31
- Andover: NA
- Tewksbury: IA37, IA38, IA40, IA41, IA42, IA43, IA44, IA46, IA47, IA48, IA49, IA50, IA51, IA52, IA54, IA55, IA56

5.1.10 Sphagnum Hummocks/Mats and/or Moss Covered Logs Overhanging/Adjacent to Standing Water

Table 11 provided in Appendix C identifies wetland impact areas with sphagnum hummocks/mats and/or moss covered logs overhanging/adjacent to standing water. These areas are typically regarded as favored habitats for various amphibians especially the four-toed salamander (*Hemidactylium scutatum*) Wetland Impact areas that exhibit these characteristics include;

- Dracut: IA28,
- Andover: NA
- Tewksbury: IA40, IA49, IA55

5.1.11 Important Habitat Characteristics Associated with Streams

Perennial and intermittent streams generally play a critical role in maintaining water quality, wildlife habitat, and biodiversity. Channelized flows provide habitat for mammals, reptiles and amphibians and also play a role in the life cycles of many insects and avian species. Intermittent streams also help cycle leaf litter and other organic debris on the forest floor. All organisms living in and around these streams can be affected by significant changes in natural channel characteristics, erosion patterns, and flow. In addition, uplands located within close vicinity to watercourses have the potential to provide quality nesting habitat for a number of species of herpetofauna. Important habitat characteristics for certain species of herpetofauna include: exposed areas of well drained, or sandy soils. (DeGraaf and Rudis 1983). Table 12 provided in Appendix C identifies important habitat characteristics associated with streams.

Important stream habitat were noted within the following impact areas:

Medium /large flat rocks within streams and or flat rocks and logs on banks or within an exposed portion of stream bed;

- Dracut: NA
- Andover: NA
- Tewksbury: IA42

Overhanging stream banks

- Dracut: IA17, IA21
- Andover: NA
- Tewksbury IA42

5.1.12 Wildlife Dens and Nests

During field evaluation of each of the wetland impact areas, searches were made for wildlife dens and nests for a variety of animal species. These included dens and nest for turtles, bank swallows (*Riparia riparia*), bald eagle (*Haliaeetus leucocephalus*), great blue heron (*Ardea herodias*), otter (*Lontra canadensis*), mink, beaver (*Castor canadensis*), and osprey (*Pandion haliaetus*). Turtle nest were how ever found in the vicinity of WI areas 32 and 33. Table 13 provided in Appendix C lists observations relative to wildlife dens and nests.

Wildlife Dens and Nests

- Dracut: NA
- Andover: NA
- Tewksbury: NA

5.1.13 Emergent Wetlands

On the Project Site, emergent wetland pockets occur within maintained portions of the utility corridor. Emergent wetlands are characterized by the presence of rooted, emergent herbaceous vegetation, and include marshes, meadows, and fens. Marshes can be deep or shallow and can occupy an entire wetland or can be part of a larger wetland. Cattails, grasses, sedges and rushes are typical marsh plants. Marsh wren (Cistothorus palustris), rails, red-winged blackbird (Agelaius phoeniceus), painted turtle (Chrysemys picta), bullfrog (Rana catesbeiana) and mink are often found in marshes (DeGraaf and Rudis 1983). Table 14 provided in Appendix C identifies emergent wetland with important habitat characteristics noted in impact areas.

Emergent wetland vegetation at least seasonally flooded >5 cm during the growing season was noted in impact areas:

› Dracut: IA1, IA15, IA28, IA29, IA30, IA31, IA32, IA34
› Andover: NA
› Tewksbury: IA37, IA38, IA41, IA43, IA44, IA47, IA48, IA49, IA50, IA51, IA52, IA54, IA56, IA57

Emergent wetland vegetation at least seasonally flooded >25cm during the growing season was noted in impact areas:

› Dracut: IA30
› Andover: NA
› Tewksbury: IA48, IA49, IA50, IA51, IA52, IA,54, IA56

Persistent emergent wetland vegetation at least seasonally flooded >5cm during the growing season was noted in impact areas:

› Dracut: IA1, IA28, IA30, IA31, IA32, IA34
› Andover: NA
› Tewksbury: IA37, IA38, IA41, IA43, IA44, IA47, IA48, IA49, IA50, IA51, IA52, IA54, IA56, IA57

Persistent emergent wetland vegetation at least seasonally flooded >25cm during the growing season was noted in impact areas:

› Dracut: IA30
› Andover: NA
› Tewksbury: IA48, IA49, IA50, IA51, IA52, IA,54, IA56

Emergent cattail wetlands at least seasonally flooded >5 cm during the growing season:

› Dracut: IA1, IA28, IA30, IA31, IA34
› Andover: NA
› Tewksbury: IA37, IA38, IA41, IA44, IA47, IA48, IA49, IA50, IA51, IA52, IA54, IA56, IA57

Emergent cattail wetlands at least seasonally flooded >25 cm during the growing season:

› Dracut: IA30,
› Andover: NA
› Tewksbury: IA48, IA49, IA50, IA51, IA52, IA54, IA56

Emergent fine-leaved emergent wetlands at least seasonally flooded >5 cm during the growing season:

- Dracut: IA1, IA28, IA29, IA32,
- Andover: IA35
- Tewksbury: IA38,

Emergent fine-leaved emergent wetlands at least seasonally flooded >25 cm during the growing season:

- Dracut: NA
- Andover: NA
- Tewksbury: NA

5.2 Landscape Context (Habitat Continuity and Connectivity)

Landscape context is divided into two subsections, habitat continuity and connectivity with adjoining natural habitats. Habitat continuity generally relates to the size of wildlife habitats while habitat connectivity deals with potential migratory corridors for wildlife. The evaluation of habitat continuity and connectivity relied on information collected in the field but also employed information assembled from aerial orthophotography and MAGIS data layers. These important wildlife characteristics are discussed below.

5.2.1 Habitat Continuity

The evaluation of habitat continuity takes into consideration the size of habitat patches or interrelated mosaics of habitat on the landscape. Patch size is an important wildlife habitat feature that takes into consideration the suitability of an area based on the availability of life requisites required by a variety of wildlife species. Although habitat size requirements differ from species to species, large blocks of unfragmented habitats are essential for a number of area-sensitive wildlife species. Table 15 provided in Appendix C identifies landscape context and habitat continuity features noted in wetland resource impact areas;

Landscape context related to habitat continuity were identified at the following Project wetland impact areas:

The following impact areas are part of an emergent marsh greater than 1.0 acre:

- Dracut: IA1, IA10, IA28, IA30, IA31, IA32, IA34
- Andover: NA
- Tewksbury: IA36, IA37, IA38, IA40, IA41, IA44, IA47, IA48, IA49, IA50, IA51, IA52, IA54, IA54a, IA56, IA57, IA58

The following impact areas are part of an emergent marsh greater than 2.0 acre:

› Dracut: IA1, IA28, IA30, IA31, IA32, IA34
› Andover: NA
› Tewksbury: IA37, IA38, IA40, IA41, IA44, IA48, IA49, IA50, IA51, IA52, IA54, IA54a, IA56, IA57, IA58

The following impact areas are part of an emergent marsh greater than 5.0 acre:

› Dracut: IA1, 1A30, IA31, IA34
› Andover: NA
› Tewksbury: IA49, IA50, IA51, IA52, IA54, IA54a, IA56, IA58

The following impact areas are part of an emergent marsh greater than 10.0 acre;

› Dracut: IA34
› Andover: NA
› Tewksbury: 1A56, 1A58

The following impact areas are part of a wetland complex of at least 1 acre:

› Dracut: IA1, IA7, IA8, IA9, IA10, IA12, IA17, IA18, IA21, IA22, IA28, IA29, IA30, IA31, IA32, IA34
› Andover: IA35
› Tewksbury: IA36, IA37, IA38, IA39, IA40, IA41, IA42, IA43, IA44, IA46, IA47, IA48, IA49, IA50, IA51, IA52, IA53, IA54, IA55, IA56, IA57, IA58

The following impact areas are part of a wetland complex of at least 2 acre:

› Dracut: IA1, IA8, IA9, IA18, IA21, IA28, IA29, IA30, IA31, IA32, IA34
› Andover: IA35
› Tewksbury: IA36, IA37, IA38, IA39, IA40, IA41, IA42, IA43, IA44, IA46, IA47, IA48, IA49, IA50, IA51, IA52, IA53, IA54, IA54a, IA55, IA56, IA57, IA58

The following impact areas are part of a wetland complex of at least 5 acre:

› Dracut: IA1, IA8, IA9, IA21, IA29, IA30, IA31, IA34
› Andover: NA
› Tewksbury: IA36, IA37, IA38,, IA40, IA1, IA42, IA43, IA48, IA47, IA49, IA50, IA51, IA52, IA53, IA54, IA55, IA56, IA57, IA58

The following impact areas are part of a wetland complex of at least 10 acre:

- Dracut: IA34
- Andover: NA
- Tewksbury: IA38, IA43, IA50, IA54, IA54a, IA55, IA56, IA58

The following impact areas are part of a contiguous forest of at least 50 acre:

- Dracut: IA9, IA17, IA18, IA21, IA25, IA28
- Andover: NA
- Tewksbury: IA50, IA51, IA52, IA53, IA54, IA54a, IA55, IA56, IA57, IA58

The following impact areas are part of a contiguous forest of at least 100 acre:

- Dracut: IA9, IA17, IA18, IA21, IA25, IA28
- Andover: NA
- Tewksbury: IA50, IA51, IA52, IA53, IA54, IA54a, IA55, IA56, IA57, IA58

The following impact areas are part of a contiguous forest of at least 250 acre:

- Dracut: NA
- Andover: NA
- Tewksbury: IA50, IA51, IA52, IA53, IA54, IA54a, IA55, IA56, IA57, IA58

The following impact areas are part of a contiguous forest of at least 500 acre:

- Dracut: NA
- Andover: NA
- Tewksbury: IA50, IA51, IA52, IA53, IA54, IA54a, IA55, IA56, IA57, IA58

The following impact areas include grassland habitat >1 acre:

- Dracut: NA
- Andover: NA
- Tewksbury: NA

The following impact areas include special habitat:

- Dracut: NA
- Andover: NA
- Tewksbury: NA

5.2.2 Habitat Connectivity

As a means to characterize the connectivity relationship of the wetland impact areas to surrounding habitats five categories of habitat connectivity were considered. These include:

1. no direct connections to adjacent areas of wildlife habitat (little connectivity function),
2. connectors numerous or impact area is imbedded in a large area of natural habitat (limited connectivity function),
3. impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function),
4. impact area serves as part of a sole connector to adjacent areas of habitat (important for connectivity function), and
5. impact area serves as the only connector to adjacent areas of habitat (very important for connectivity function). The results are included below:

Habitat connectivity within a landscape is an important feature that takes into consideration wildlife migratory behavior and requirements. It is also an important feature that contributes to the maintenance of regional population dynamics that are essential for the long-term viability of local wildlife populations.

New utility structure installations, temporary impacts resulting from swamp mat placement, and permanent habitat conversion along a relatively narrow strip parallel to the maintained portion of the utility corridor will not significantly affect the current wildlife migratory habitat provided by the Project Site. Table 16 provided in Appendix C provides a summary of wetland impact area connectivity with adjacent habitats.

The following wetland impact areas have little connectivity to adjacent habitat:

- Dracut: NA
- Andover: NA
- Tewksbury: IA45, IA58

The following wetland impact areas have limited connectivity to adjacent habitat:

- Dracut: IA1, IA8, IA9, IA10, IA11, IA13, IA14, IA15, IA16, IA19, IA22, IA23, IA24, IA25
- Andover: NA
- Tewksbury: IA45, IA58

The following wetland impact areas are somewhat important for connectivity to adjacent habitat:

- Dracut: IA9, IA10, IA11, IA13, IA14, IA15, IA16, IA19, IA22, IA23, IA24, IA25
- Andover: NA
- Tewksbury: IA53

The following wetland impact areas are important for connectivity to adjacent habitat:

- Dracut: NA
- Andover: NA
- Tewksbury: NA

The following wetland impact areas are very important for connectivity:

- Dracut: NA
- Andover: NA
- Tewksbury: NA

5.3 Habitat Degradation

Habitat degradation that may have some effect on habitat importance within the Project corridor includes: the presence of exotic plants, and other human disturbance and development. Wetland impact areas that exhibited some of these characteristics are listed in Table 17 provided in Appendix C and summarized below:

Significant signs of erosion and sedimentation was noted within the following impact areas:

- Dracut: IA3, IA4, IA5, IA6
- Andover: NA
- Tewksbury: IA45

Significant invasion of exotic plants (e.g. multiflora rose, bittersweet, common reed, glossy buckthorn, reed canary grass, common buckthorn, purple loostrife, autumn olive) has been noted within the following impact areas;

- Dracut: IA7, IA8, IA8, IA9, IA10, IA11, IA12, IA13, IA14, IA15, IA16, IA17, IA18, IA19, IA20, IA21, IA22, IA23, IA24, IA26, IA27, IA28, IA30, IA31, IA32, IA33
- Andover: IA35
- Tewksbury: IA36, IA37, IA38, IA39, IA40, IA41, IA42, IA43, IA44, IA45, IA46, IA47, IA50, IA52, IA54, IA54a, IA57, IA58

Disturbance from roads was noted in the following wetland impact areas.

- Dracut: IA2, IA3, IA6, IA11, IA12, IA19, IA32, IA34
- Andover: NA
- Tewksbury: IA58

Other forms of past human disturbance activities have been noted on the Project Site. The following Impact areas show evidence of routine utility corridor maintenance practices promoting emergent and/or scrub-shrub habitats.

- Dracut: IA2, IA3, IA5, IA7, IA8, IA10, IA11, IA13, IA14, IA15, IA16, IA17, IA18, IA19, IA20, IA21, IA22, IA23, IA24, IA25, IA26, IA27, IA28, IA29, IA30, IA31, IA32, IA33
- Andover: IA35
- Tewksbury IA36, IA37, IA38, IA39, IA40, IA41, IA42, IA43, IA44, IA45, IA46, IA47, IA48, IA49, IA50, IA51, IA52, IA54, IA54a, IA57, IA58

These practices however act to provide some diversity to the local wetland community.

6

Adverse Effect Analysis

Construction of the Project described above and illustrated on the project plans provided in Appendix B will result in unavoidable impacts to wetland resource areas due to the functional layout of the required equipment. The sections below outline impacts to resource areas, including permanent, temporary and secondary impacts. A comprehensive listing of all wetland impacts are provided in Table 18 included in Appendix C.

6.1 Summary of Permanent Wetland Resource Loss Impacts

Permanent wetland resource impacts resulting from the MVRP are primarily the result of the unavoidable placement of utility pole structures in a wetland resource areas including BVW, RFA, and ILSF. Some permanent fill (810 sf) is also associated with a new wetland crossing in Dracut in Wetland 29.

Along the Massachusetts portion of the Project, 43 poles will be located in BVW, nine (9) in RFA, and six (6) in BLSF. Table 19 provides a summary of the permanent (fill) wetland impacts proposed as part of the MVRP.

Table 19 Permanent Wetland Resource Impacts

Town	BVW Impact (SF)	RFA Impact (SF)	BLSF Impact (SF)
Dracut	1,060	170	0
Andover	0	0	0
Tewksbury	953	0	164
Total	2,013	170	164

The permanent fill associated with new utility pole structures are due to either the construction of caisson foundations to support structures or the direct embedment of structures within corrugated pipes. Permanent fill is determined by the diameter of the caisson or corrugated pipe used to support the structures.

6.2 Summary of Anticipated Temporary Habitat Alterations

The Project will also result in temporary wetland impacts resulting from the placement of timber mats required to support heavy equipment within wetlands. Tables 18 (in Appendix C) and 20 provides a summary of the temporary wetland impacts proposed as part of the MVRP. It is important to note that timber mats are a Best Management Practice used to minimize rutting from heavy equipment within wetland resource areas.

Table 20 Temporary Wetland Impacts

Town	BVW Impact (SF)	RFA Impact (SF)	BLSF Impact (SF)
Dracut	111,208	67,922	365
Andover	305	0	0
Tewksbury	463,531	0	66,187
Total	575,044	67,922	66,552

6.3 Summary of Anticipated Permanent Habitat Impacts and Changes Caused by Habitat Conversion

In addition to permanent fill associated with the installation of utility structures, the Project includes some tree clearing along the limits of the existing maintained ROW. This tree clearing is needed to facilitate the construction of the Project in specific locations and to provide necessary conductor clearance. The tree clearing will not result in wetland resource loss but rather a conversion of forest to shrub and/or herbaceous habitats. Table 21 below provides a summary of wetland resource conversion associated with the MVRP.

Table 21 Tree Clearing

Town	BVW Conversion (SF)	RFA Conversion (SF)	BLSF Conversion (SF)
Dracut	16,090	5,774	0
Andover	0	0	0
Tewksbury	84,197	0	64,710
Total	100,287	5,774	64,710

6.4 Wildlife Habitat Impacts

The Project will result in three (3) general types of impacts to wetland resources. These include wetland loss as a result of wetland fill associated with utility structure placement, temporary disturbance caused by construction activities, and wetland vegetation conversions resulting from conversion of forested wetlands to scrub-shrub and/or emergent wetlands. The following is a summary of potential adverse effects attributed to these impact types.

6.4.1 Permanent Wetland Impacts

The permanent wetland impacts (loss) associated with the MVRP Project are mostly associated with the installation of new utility poles. These impacts are individually very small and scattered along the length of the project. Table 22 lists the number of utility poles located within wetland resource areas.

Table 22 Number of Utility Structures located within Wetland Resource Areas

Town	BVW	RFA	BLSF
Dracut	8	9	0
Andover	0	0	0
Tewksbury	35	0	6
Total	43	9	9

Of the total fill amount in BVW (2,013 sf), approximately 1,203 sf are attributed to structure placement, the remaining amount of 810 sf will result from the improvement of an existing wetland crossing (IA 29) located in Dracut. Fill amount in RFA and BLSF are 170 sf and 164 sf respectively.

Because of the small nature of these fill amounts there will not be any losses of important wildlife habitat attributed to the installation of the planned utility structures. Most of these fill locations are located on portions of the existing ROW that are regularly maintained. The exceptions being some locations where trees will be removed as part of the project. Locations where trees will be removed are discussed below.

6.4.2 Temporary Wetland Impacts

The temporary wetland impacts associated with the project are by far the largest wetland resource impact category. All of these impacts will occur on the existing maintained portion of the Project ROW. In BVW (including BVW that overlaps with RFA and BLSF) these impacts will primarily be caused by the temporary placement of timber mats for access and construction work areas. Following construction these mats will be removed and the areas where they were placed will be allowed to revert back to existing conditions. As necessary other restoration measures may be employed as detailed in Section 7 below.

Important wildlife habitat features that may be temporarily affected by construction activities include; food availability of some types of wildlife food, disruption of small mammal burrows, displacement of standing water suitable for amphibian use, and disruption of shrubs and emergent vegetation used for nesting and cover.

6.4.3 Forested Wetland Conversion Impacts

Tree clearing impacts in wetland resource areas will result in some loss of important wildlife habitat on the Project site. This loss is primarily associated with the loss of dead standing trees of various size, some living and dead trees with cavities, and some large trees with a diameter at breast height (dbh) greater than 3-feet. Section 7 bellow will address measures to mitigate tree loss impacts.

In locations where trees will be removed temporary impacts to important wildlife habitat will also be realized. Similar impacts where temporary wetland impacts will occur include; food availability of some types of wildlife food, disruption of small mammal burrows, displacement of standing water suitable for amphibian use, and disruption of shrubs and emergent vegetation used for nesting and cover and disruption of coarse woody debris and rocks on the ground surface. As necessary other restoration measures may be employed as detailed in Section 7 below.

6.4.4 Protected Species and Vernal Pools

Potions of the Project will occur in two (2) Priory Habitats and near certified and potential vernal pools mapped on and near the ROW by NHESP. While it is not possible to avoid work in Priority Habitats construction measures will be taken in these areas to avoid and prevent adverse effects to these resources. Construction activities have been planned to avoid any work directly within the vernal pools. As a means to avoid and minimize impacts to these resources, NEPCO has discussed the project with NHESP. At this time a Massachusetts Endangered Species Act Checklist has been submitted to NHESP for a "take"/"no-take" determination. Measures to avoid impacts to the protected species known to occur on the Project site have been included in the checklist. A summary of these measures are present below in Section 7.

7

Proposed Mitigation

In order to meet mitigation requirements for all of the regulatory authorities, wetland loss will be mitigated at a ratio of at least 2:1 and will occur in the towns where the loss occurs (Dracut and Tewksbury). NEP proposes to provide compensatory mitigation in the form of wetland replication for permanent impacts, and in-situ restoration for temporary and forest conversion impacts, these are described in more detail below.

7.1 Avoidance and Minimization

The planning and design portion of Project development incorporated several measures to avoid direct wetland impacts. Structure locations and their associated work areas and pull-sites were relocated and/or resized to avoid encroaching upon wetlands when practicable. When practicable routing of access roads to and within the Project ROW was designed to avoid wetlands. Existing access roads on the ROW were employed where practicable to avoid unnecessary wetland impacts.

NEP evaluated access roads and routes throughout the length of the ROW to optimize access to work areas while avoiding and minimizing wetland encroachment. Concurrent with this activity, work pads were located and configured to avoid and minimize the temporary placement of timber mats in wetland resource areas. Avoidance and minimization measures included:

- Eliminating wetland crossings by identifying locations where access to a work area would only be achieved from one location by employing "turn around points;
- Using known off-ROW access points to avoid crossings; and
- Where crossings could not be avoided, wetlands will be crossed at the narrowest point within the ROW corridor and/or along existing historic hard-bottomed surfaces.

Based on these guidelines, the Project team was able to remove proposed access from four wetland areas to avoid impacts.

Additionally, NEP evaluated practicable alternatives for avoiding the location of structures in wetlands. As part of this process, locations of utility structures were selected and modified until a balance between maximum wetland avoidance and engineering requirements of utility pole span lengths and conductor clearances could be achieved. Following the initial layout of structures, the team coordinated to relocate three structures and eliminate one structure to avoid wetland impacts.

One of the relocated structures eliminated the need to mat within the beaver impoundment located in Wetland 17. The team was also able to make a number of design modifications, including shifting work pads in nine locations, to avoid and minimize wetland impacts.

7.2 Best Management Practices (BMPs)

As a means to minimize wetland impacts during construction, construction crews will implement a variety of BMPs. Some of the BMPs that will be used during construction include the following:

- **Swamp Mats (Timber Mats)** are primarily used as a means to minimize soil disturbance for access, bridges, and work platforms for construction equipment in wetland or soft soil situations. Mats may also be used in otherwise sensitive areas such as lawns.
- **Erosion and Sedimentation Control Barriers** are devices generally installed between construction activities and sensitive resource areas such as wetlands. They are designed to prevent and minimize the transport of sediment carried by stormwater into the sensitive resource areas down-gradient. In many situations they also act to mark the limit of work on a project site. Common erosion control barriers include silt fence, straw bales, silt bags, and straw wattles.
- **Erosion Control Blankets** are used to temporarily stabilize disturbed soils on steep slopes and promote rapid growth of vegetation for permanent stabilization.
- **Hydro Seeding** is a technique that is used to promote rapid stabilization of disturbed soils (including slopes) and rapid growth of vegetation. In practice, fiber mulch suspended in water along with plant seeds and tackifiers are sprayed on disturbed areas covering the entirety of the disturbed area. The fiber mulch adheres to the ground surface forming a thin mat that stabilizes the soil surface, retains moisture, and helps to promote rapid germination of plant seeds.
- **Construction Signage** is typically used throughout the construction ROW alerting contractors of sensitive areas (including wetland, rare species, and cultural resource areas), approved access locations, and non-approved access locations.
- **Turbidity Controls** are typically used in conjunction with other BMPs when work occurs either in or immediately adjacent to areas that are inundated. Typically they consist of a geotech fabric suspended from flotation booms and weighted at the bottom.
- **Dewatering Basins/Dirt Bags/Filter Bags** are devices that are employed when it is necessary to remove water from an excavation for a variety of purposes. In practice sediment-laden water from an excavation is pumped into these devices where the sediment is allowed to settle out of the water (as in the case of a dewatering basin) and/or is actively filtered (dirt/filter bags).
- **Concrete Waste Sumps** are devices that are similar to dewatering basins but are primarily used to receive concrete truck waste and wash water following pouring of concrete for structure foundations.

The BMPs listed above are some of the typical protective measures that will be employed during construction. These and other protective measures that will used are detailed in NEPCO's Manual for Access, Maintenance and Construction Best Management Practices (EG-303NE). .

7.2.1 Swamp Mats

Swamp mats will be used to provide access across wetlands where needed. Swamp mats consist of timbers that are bolted together and placed over wetland areas to distribute equipment loads and minimize disturbance to the wetland and soil substrates. Such temporary swamp mat access ways will be removed following completion of construction and, if necessary, areas will be restored to re-establish pre-existing topography and hydrology. Herbaceous vegetation in disturbed areas will be restored in accordance with regulatory requirements and may include the use of native wetland or conservation seed mix.

Stream crossings will be bridged with swamp mats or other temporary minimally intrusive measures unless fording is acceptable for the site and is authorized by the National Grid Environmental Scientist. Care will be taken when installing swamp mat bridges to ensure that the stream bed and banks are not damaged during installation and removal, and that stream flow is not unduly restricted. Immediately following swamp mat removal, all stream banks will be stabilized and restored to prevent sedimentation and erosion.

7.2.2 Erosion Control Barriers

Following vegetation removal, erosion and sediment control devices such as straw bales, siltation fencing, and/or chip bales will be installed in accordance with NEPCO's "Access, Maintenance and Construction Best Management Practices" document ("EG-303NE," provided as Attachment F of the FEIR), and with approved plans and permit requirements. The installation of these sediment control devices will be supervised by the NEPCO's contractor, and will be reviewed by the NEPCO's Construction Supervisor and/or designated environmental monitor. The erosion and sediment controls will be installed between the work area and environmentally sensitive areas such as wetlands, streams, drainage courses, roads, and adjacent property when work activities will disturb soils and result in a potential for erosion and sedimentation. The devices will be monitored regularly and will function to mitigate construction-related erosion and sedimentation, and will also serve as a physical boundary to delineate resource areas and to contain construction activities within approved areas.

The Project will be designed to comply with the Massachusetts Department of Environmental Protection ("MassDEP") Stormwater Management Policy (2008) and applicable town stormwater and erosion control regulations. Additionally, NEPCO and its contractors will obtain coverage under the National Pollutant Discharge Elimination System ("NPDES") Construction General Permit. A Storm Water Pollution

Prevention Plan ("SWPPP") will be prepared prior to the start of construction. Throughout the construction process, NEPCO will retain the services of an environmental monitor to ensure compliance with all federal, state, and local permit requirements and Company policies. At regular intervals and during periods of prolonged precipitation, the monitor will inspect all locations to determine that erosion controls and other environmental controls are functioning properly and make recommendations for correction or maintenance as necessary.

7.3 Standing Dead Tree/Cavity Replacement

Avoidance of standing dead trees (snags), during the tree clearing process, will be implemented to the extent practicable to mitigate the loss of this "important wildlife habitat" feature. However, removal of these important wildlife habitat features will be unavoidable in situations where there are construction safety issues and conductor clearance concerns.

The loss of snags is the most significant wildlife habitat characteristic loss due to tree clearing activities. To help mitigate the loss of snags, NEPCO proposes the following:

- Identification of replacement snag trees. Proposed snags will be identified during a site walk with a professional forester from NEPCO prior to any tree clearing activity. The proposed snags will be located within or near and distributed throughout the habitat conversion area. Replacement snags will include:
    - Live trees of 12 inches in diameter at breast height (dbh) or greater. Three snags per acre with a 12 inch dbh or greater will assure that the minimum requirements of most wildlife species will be met.
    - Live trees of 15 inches in dbh or greater. One snag 15-inch dbh or greater per acre is to act as a den tree. Den trees are trees that are living or partially living and possess a cavity large enough to serve as shelter or as a site for birds and mammals to give birth and raise young.
- Proposed snags will be marked in the field with flagging/paint to prevent removal during tree clearing activities.
- An informative "tailgate" meeting will be held with all forestry crews to detail the snag replacement strategy prior to tree clearing activities.
- Tree topping will be employed to the proposed snags to simulate natural breakage and to promote snag recruitment. Snag height will be at least six feet tall or dictated by conductor clearance standards and safety requirements.
- Snag creation/live tree decay will be aided by trunk girdling techniques. Snags may develop cavities, which may occur naturally or may be created by birds and mammals.
- The snag replacement trees will be permanently identified with signage to prevent cutting or removal during future corridor vegetative management practices.

The proposed mitigation plan, described above, was adopted from and is consistent with guidance provided by the Connecticut Department of Environmental Protection (http://www.ct.gov/deep/cwp/view.asp?a=2723&q=326090&depNav GID=1655) . This guidance was recommended by MassDEP for a recent utility project. In summary while there may be some changes in the wildlife habitat functions of the Project site, there should be no long-term adverse impacts to wetland areas currently providing wildlife habitat.

7.4 Wetland Replication

To mitigate for the permanent wetland impacts resulting from the project, NEP will replicate wetlands to account for BVW loss. Because BVW will be lost in both Dracut and Tewksbury, wetland replacement areas will be built in each town at a mitigation ratio of at least 2:1 for the amount lost.

In Dracut to account for permanent BVW loss of 1,060 sf a wetland replication area of at least 2,210 sf will be created. In Dracut, the proposed replication area is located north of Methuen Road, on the north side of Wetland 29 and east of the existing access road and proposed permanent crossing.

In Tewksbury to account for permanent BVW loss of 953 sf a wetland replication area of at least 1,906 sf will be created. In Tewksbury, the proposed replication is located north of Andover Street/Route 133, on the south side of Wetland 7A and west of the existing access road

Further details regarding the existing and proposed conditions, construction methods, and monitoring at these sites will be provided in a Wetland Replication Plans to be submitted with the Notices of Intent that will be submitted to each town.

7.5 Protected Species and Vernal Pools

Various protective measures will be taken during construction in the two Priority habitats on the project to avoid impacts to protected species.

In PH 1321/EH65 located north of River Road in Andover including areas both north and south sides of the Merrimack River at the Andover/Dracut town line, tree clearing and vegetation removal will be avoided and generally limited to only those areas needed to install new utility structures and conductors. BMPs will also be employed to prevent the introduction of sediment into the Merrimack River. These measures will be applied to prevent direct or indirect impacts to a bird and insect, both protected species known to occur in the area.

In PH 678/EH 636 located north of Methuen Street in Dracut, BMPs will also be applied to prevent the introduction of sediment into the certified vernal pool and perennial stream located there. In addition, a turtle protection plan has been developed and will be implemented in this area during construction. These measures will effectively prevent direct and indirect impacts to an amphibian and reptile both protected species known to occur in this area.

Presently a MESA Checklist has been submitted to NHESP. The Checklist includes a detailed presentation of protective measures that will be applied during construction to avoid a take of protected species. Upon NHESP's review and approval of these measures, they will be adopted and implemented during construction.

8

Conclusions

The wetland regulations define adverse effects on wildlife habitat as the alteration of any habitat characteristics listed in 310 CMR 10.60 (2) insofar as such alteration will, following two growing seasons of project completion and thereafter, substantially reduce its capacity to provide important wildlife habitat functions listed in 310 CMR 10.60(2). The alterations become "adverse" when they substantially reduce the site's capacity to provide important wildlife habitat functions and consequently reduce the site's capacity to support wildlife.

NEPCO has ensured that important habitat features have been identified and that adverse impacts have been avoided and/or minimized and mitigated to an extent possible. The proposed alterations will not substantially reduce the long-term capacity of the site to provide food, cover, migratory, and breeding areas, especially when viewed in terms of conversion of habitat types. While some of the wildlife habitat functions (e.g. food plants) associated with forested wetland will be temporarily lost due to tree clearing, they will be replaced by the habitat functions of scrub-shrub and/or emergent wetland habitat types following completion of the Project and promoted by standard utility corridor management practices.

Since the proposed habitat conversions will occur along a relatively narrow strip parallel to the maintained portion of the utility corridor, the resulting habitat change will be relatively consistent with existing utility corridor conditions. Impact area context with regard to connectivity and continuity has shown that many of the impact areas are contiguous with similar areas of habitat that will be unaffected by the project. This is especially true with regard to forested areas where some trees and snags will be lost. Because these habitat features are very common on the project site the amount of these features lost is insignificant compared to what will remain. Additionally, important wildlife habitat characteristics (i.e., snag trees) will be mitigated on-site through snag creation as discussed above.

As a result, the Project will not result in a significant change in land use and many of the wildlife species inhabiting the Project site should continue to do so following construction. While there will be some loss of important wildlife habitat associated with forested areas the changes will not substantially reduce the capacity of the area to provide important wildlife habitat functions consistent with current conditions. Therefore, the goal of no adverse effect should be met for the Project.

Appendix A:

Figures

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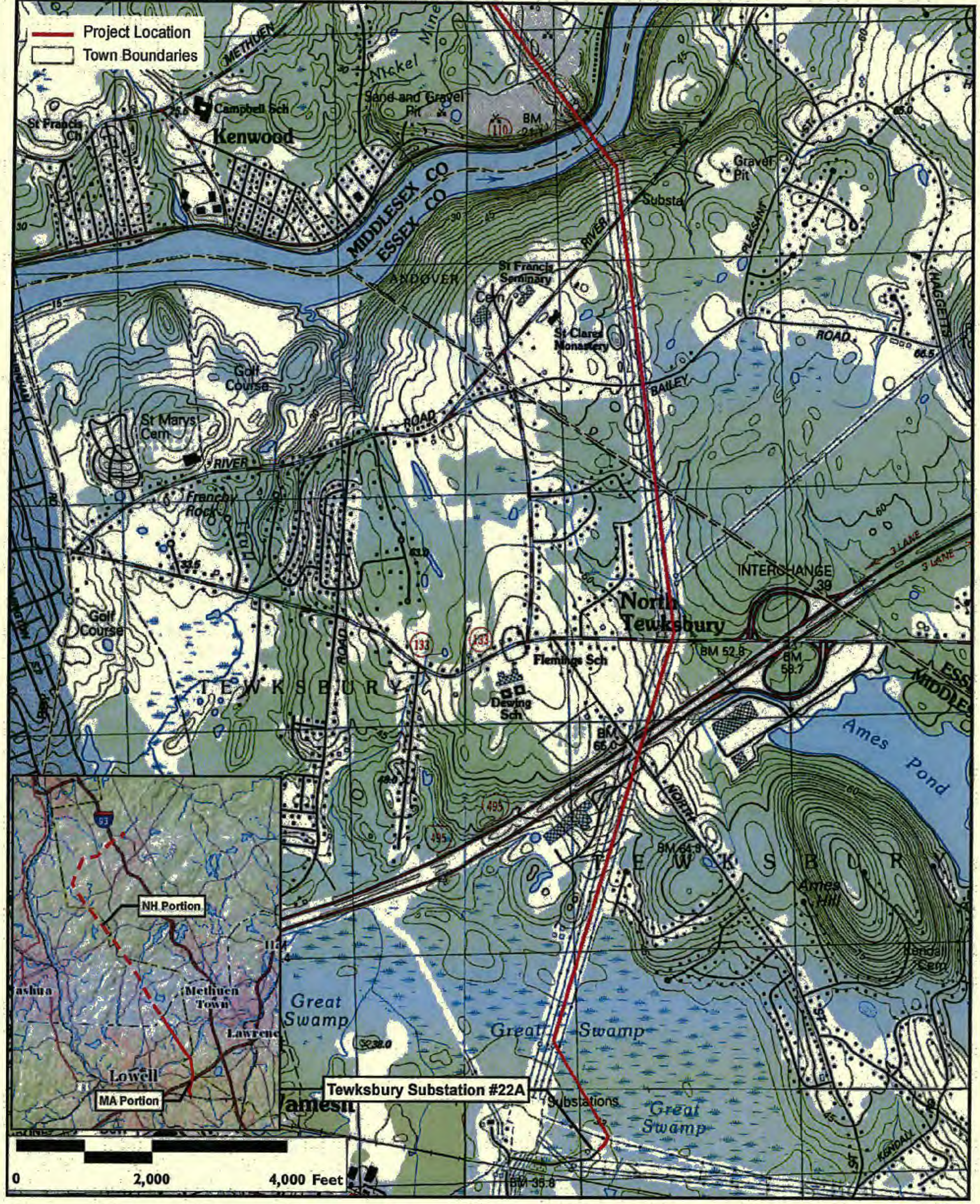

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Scale:
1 inch = 2,000 feet

Source:
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Merrimack Valley Reliability Project

Figure 1 - USGS Overview

Wildlife Habitat Evaluation

12/28/2015

Sheet 1 of 2

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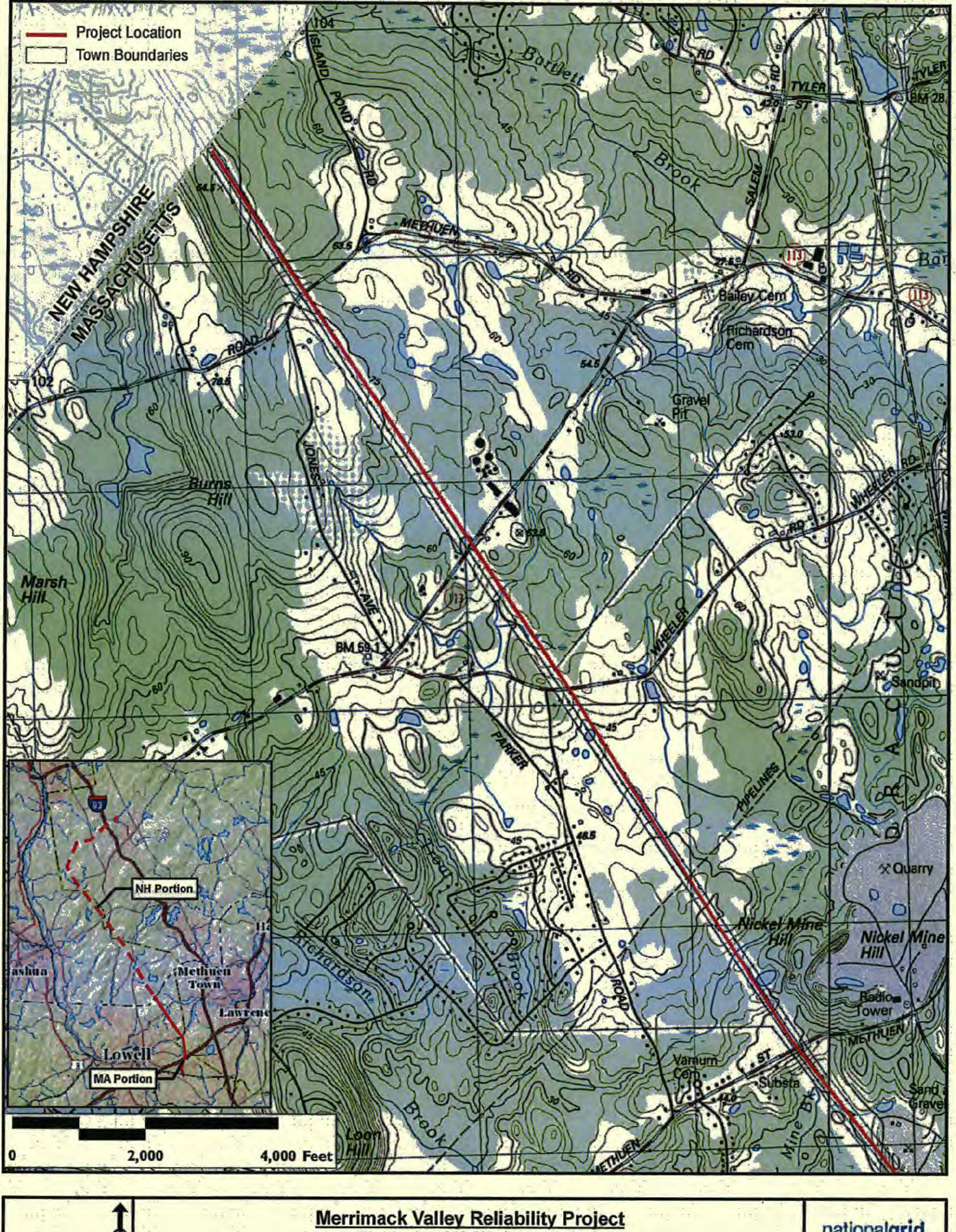

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Merrimack Valley Reliability Project
Figure 1 - USGS Overview
Wildlife Habitat Evaluation

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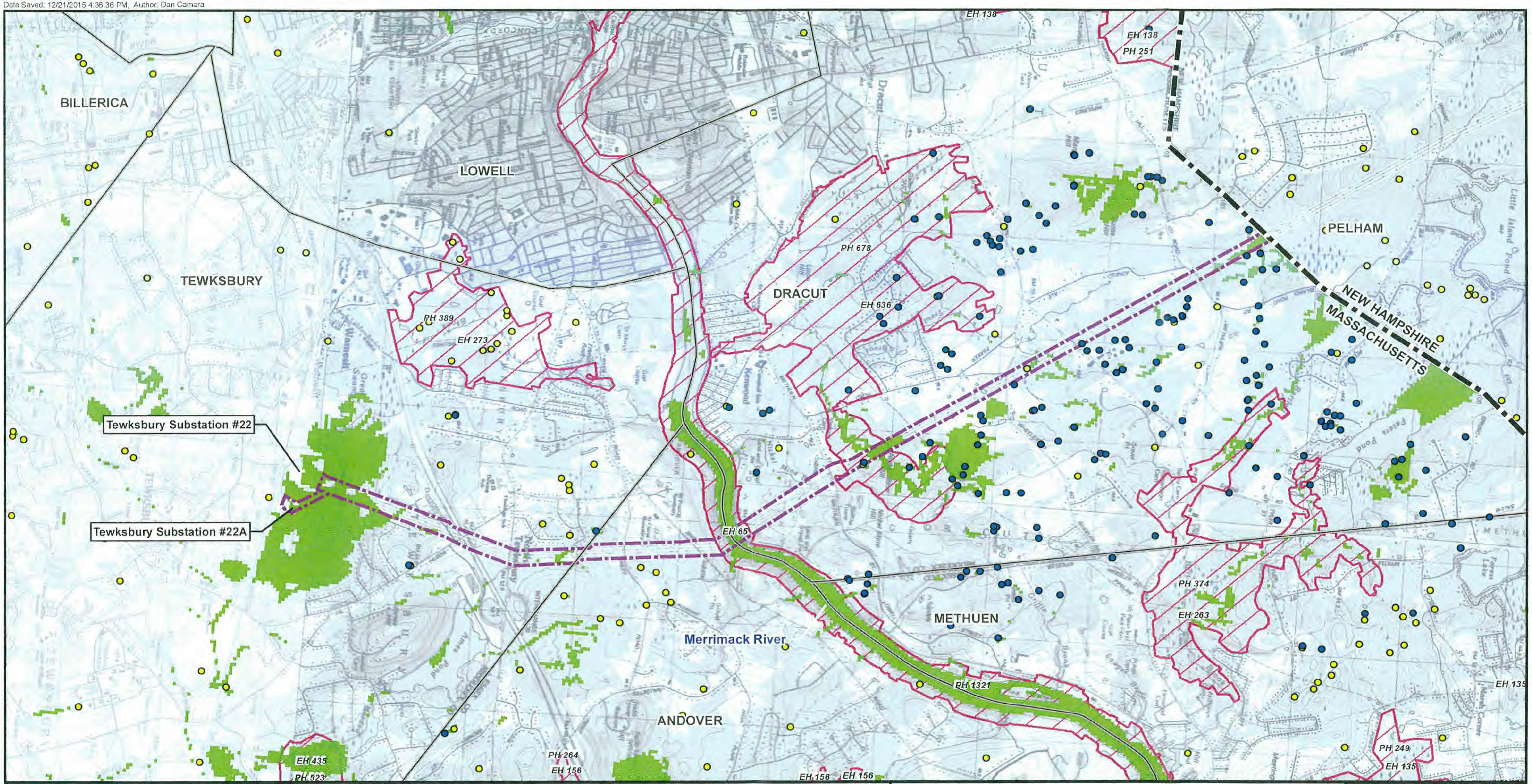

▭ MVRP Project Area (Massachusetts Portion)
🟩 Important Wildlife Habitat
● NHESP Certified Vernal Pool
● NHESP Potential Vernal Pool
▨ NHESP Priority & Estimated Habitat
▭ Town Boundary
▭ State Border

Source:
MASSGIS

0 3,000 6,000 Feet

Merrimack Valley Reliability Project

Figure 2: Habitat of Potential Regional or Statewide Importance
Wildlife Habitat Evaluation
Tewksbury Substation MA to
NH/MA State Line

12/21/2015

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THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE

Appendix B:

Impact Area Figures

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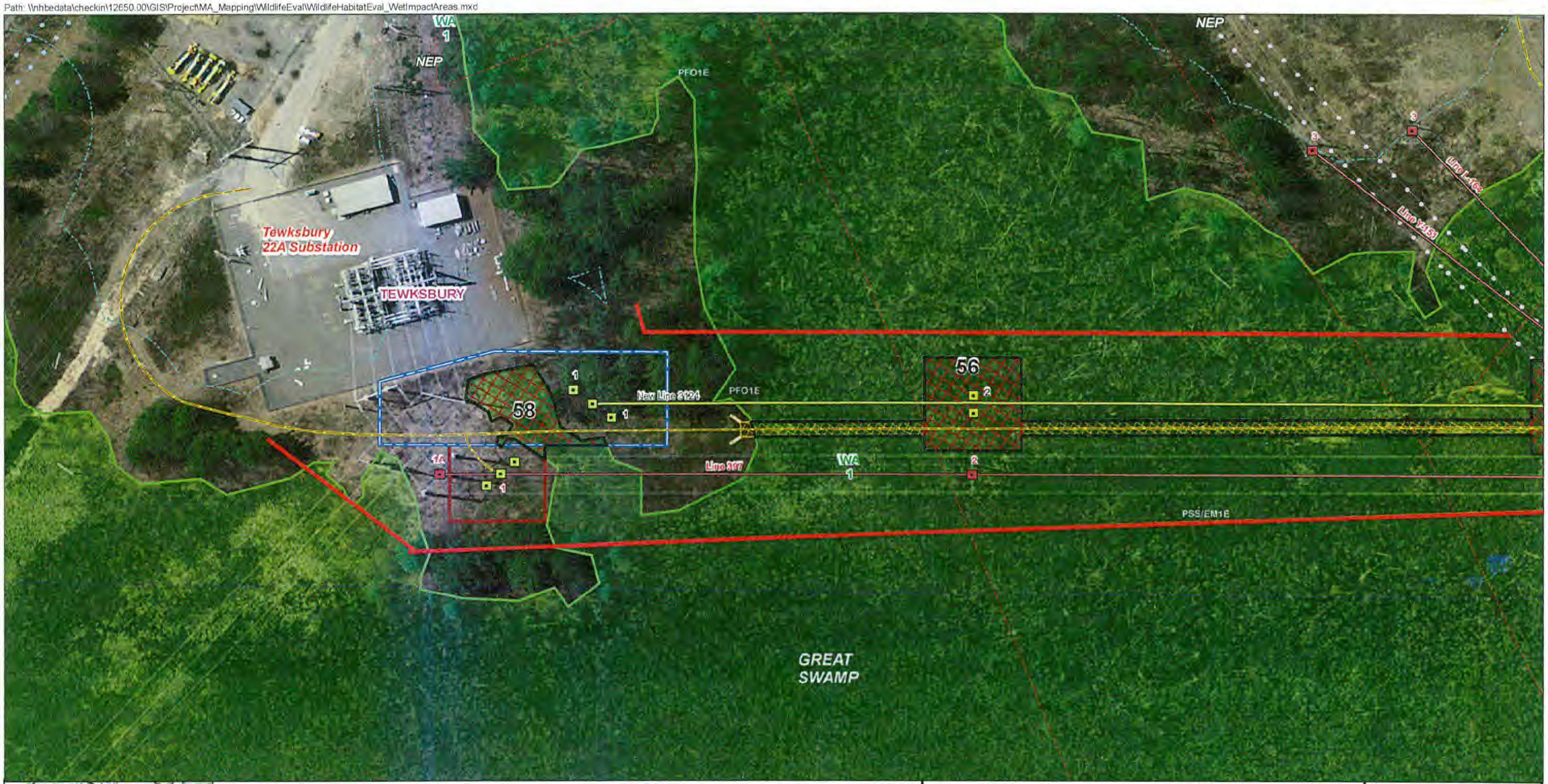

Existing Structure	Gas Pipeline ROW	USGS Stream	Construction Work Pad (100'x100')	Stone Wall
Existing Structure to be Removed	Abandoned O.I Pipeline ROW	Certified Vernal Pool	Pull Pad Site (100'x300')	Erosion Control
Proposed Structure	Delineated Wetland Edge	Potential Vernal Pool	Guard Protection Area (50'x50')	Tree Clearing Area
Proposed Guy Anchor Location	Estimated Wetland Edge	NHESP Priority or Estimated Habitat	Swamp Mat Construction Work Pad	Parcel Boundary
Existing Transmission Line	Wetland Resource Area	FEMA 100-yr Floodplain	Timber Mat Access	Town Boundary
Existing Line to be Removed	Open Water	100-ft Wetland Buffer	Proposed Permanent Crossing	
Proposed Transmission Line	Vernal Pool	200-ft Riverfront Area	Laydown Area	
ROW Boundary	Delineated Perennial Stream	200-ft Riverfront Area (approximate)	Stone Apron	
NEP Property	Delineated Intermittent Stream		Existing Culvert	
Primary Access	Wetland Replication Area		Fence	
Alternate Access	Wildlife Habitat Wetland Impact Area			

1 Inch = 100 Feet

0 50 100 200

Feet

Wildlife Habitat Evaluation
Wetland Impact Areas

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
MA/NH State Line

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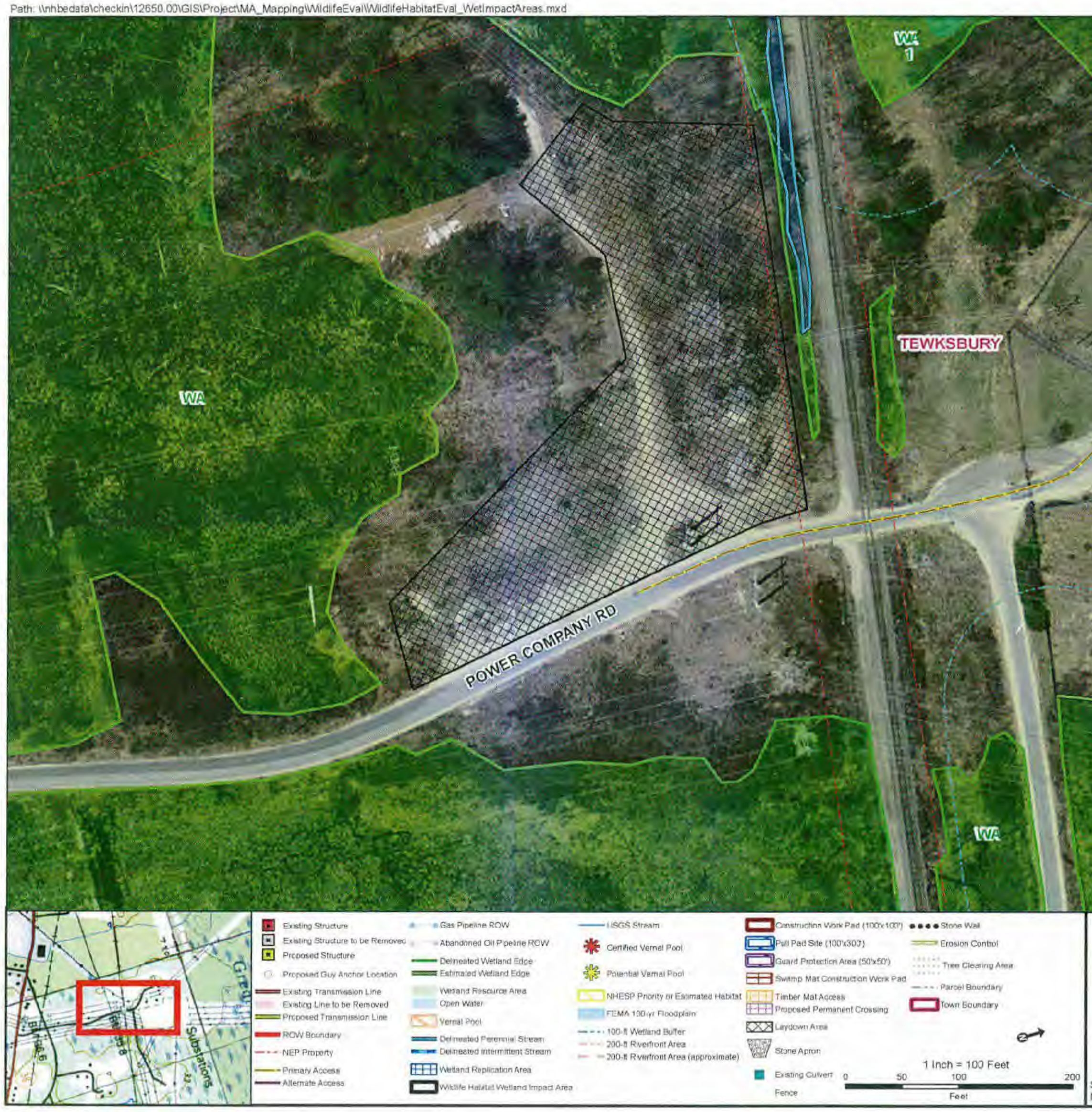

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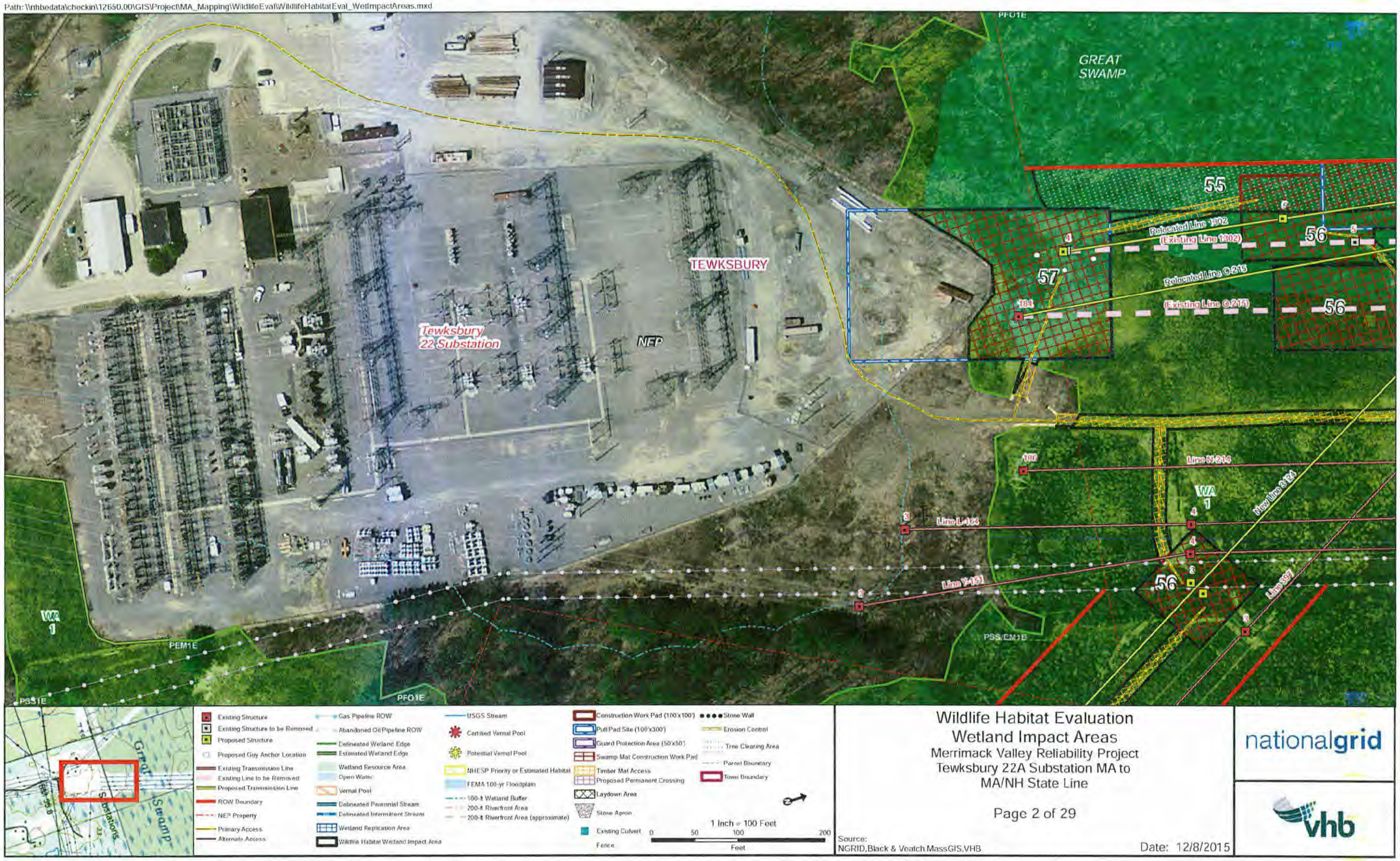

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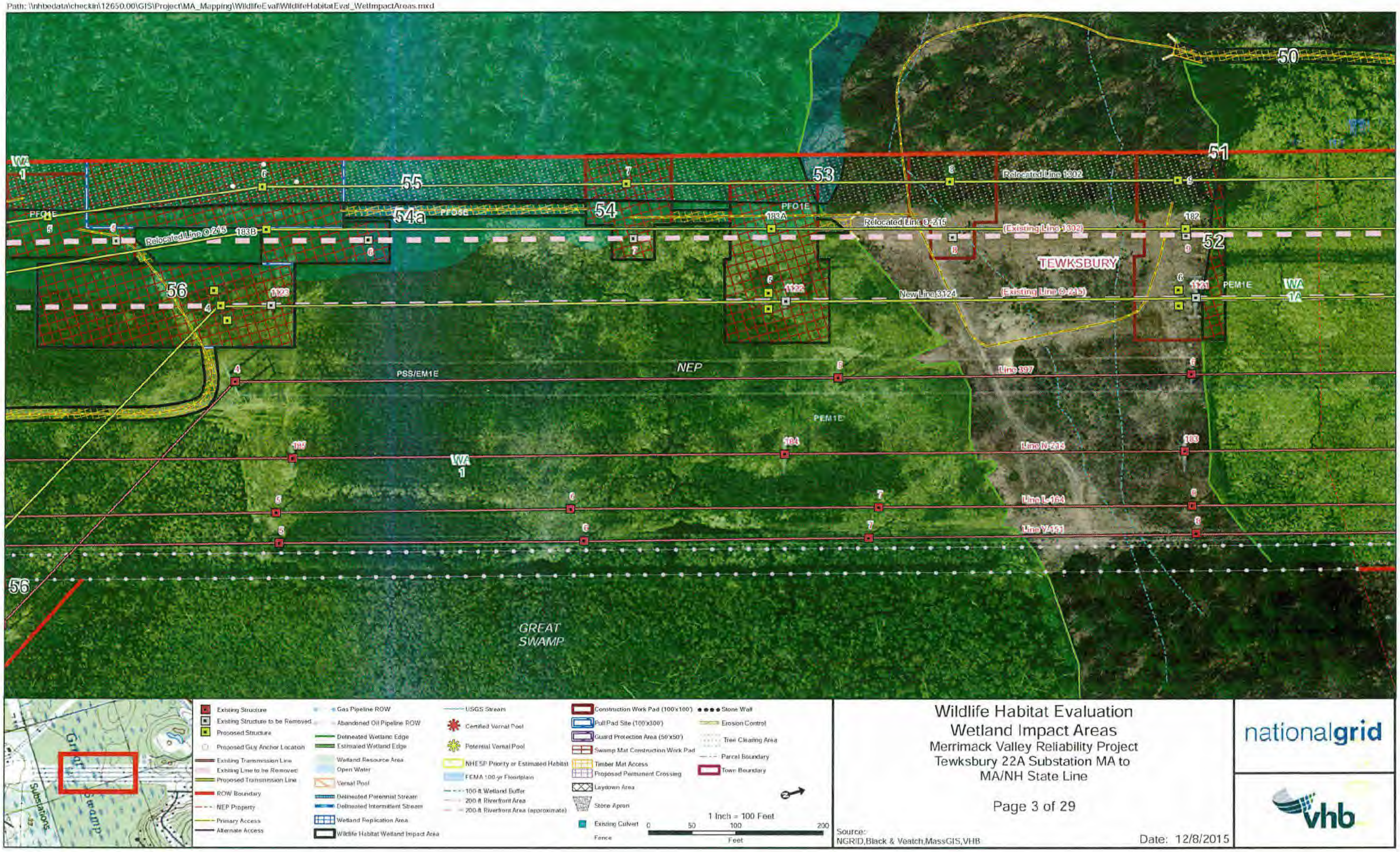

Wildlife Habitat Evaluation
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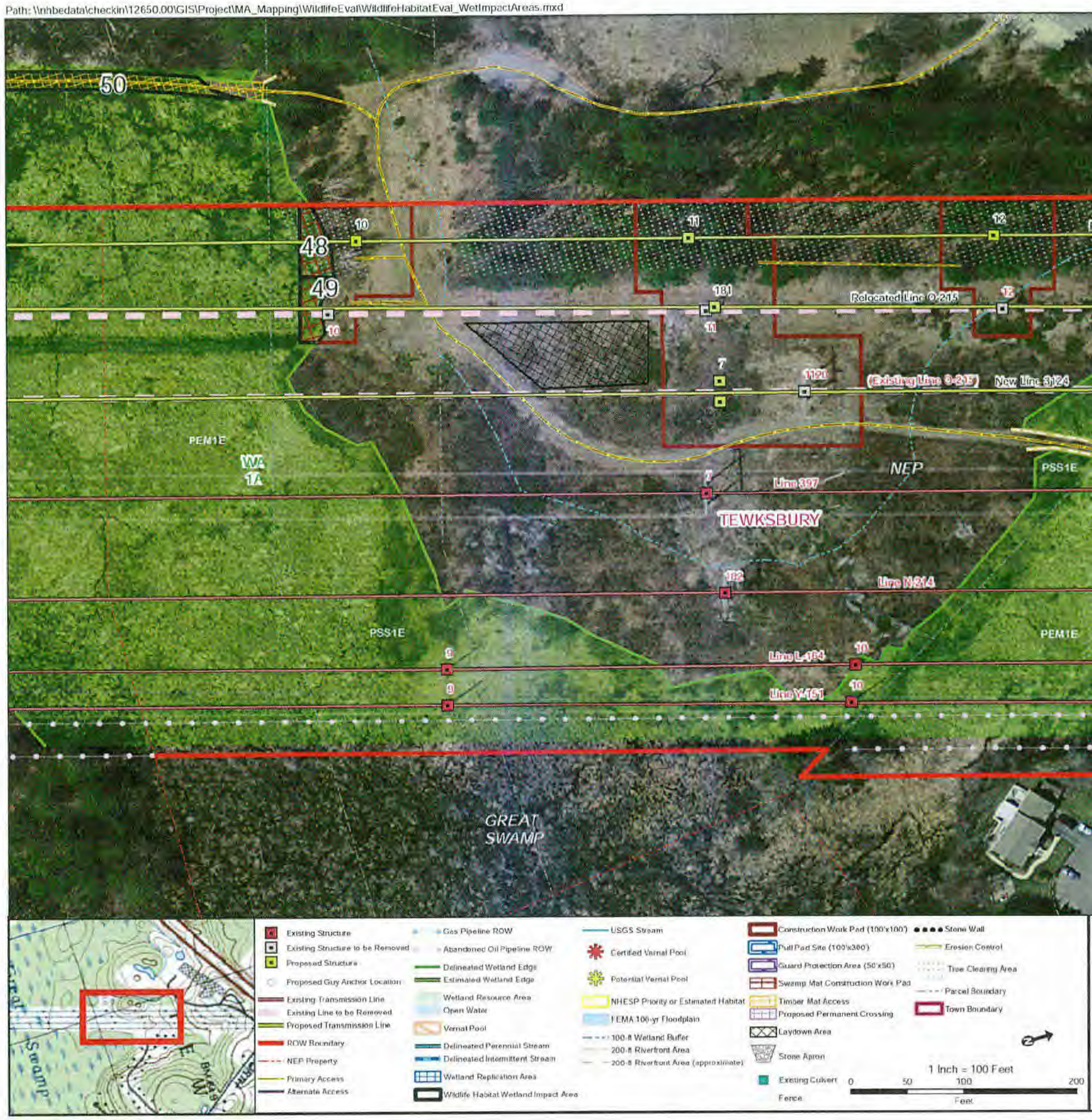

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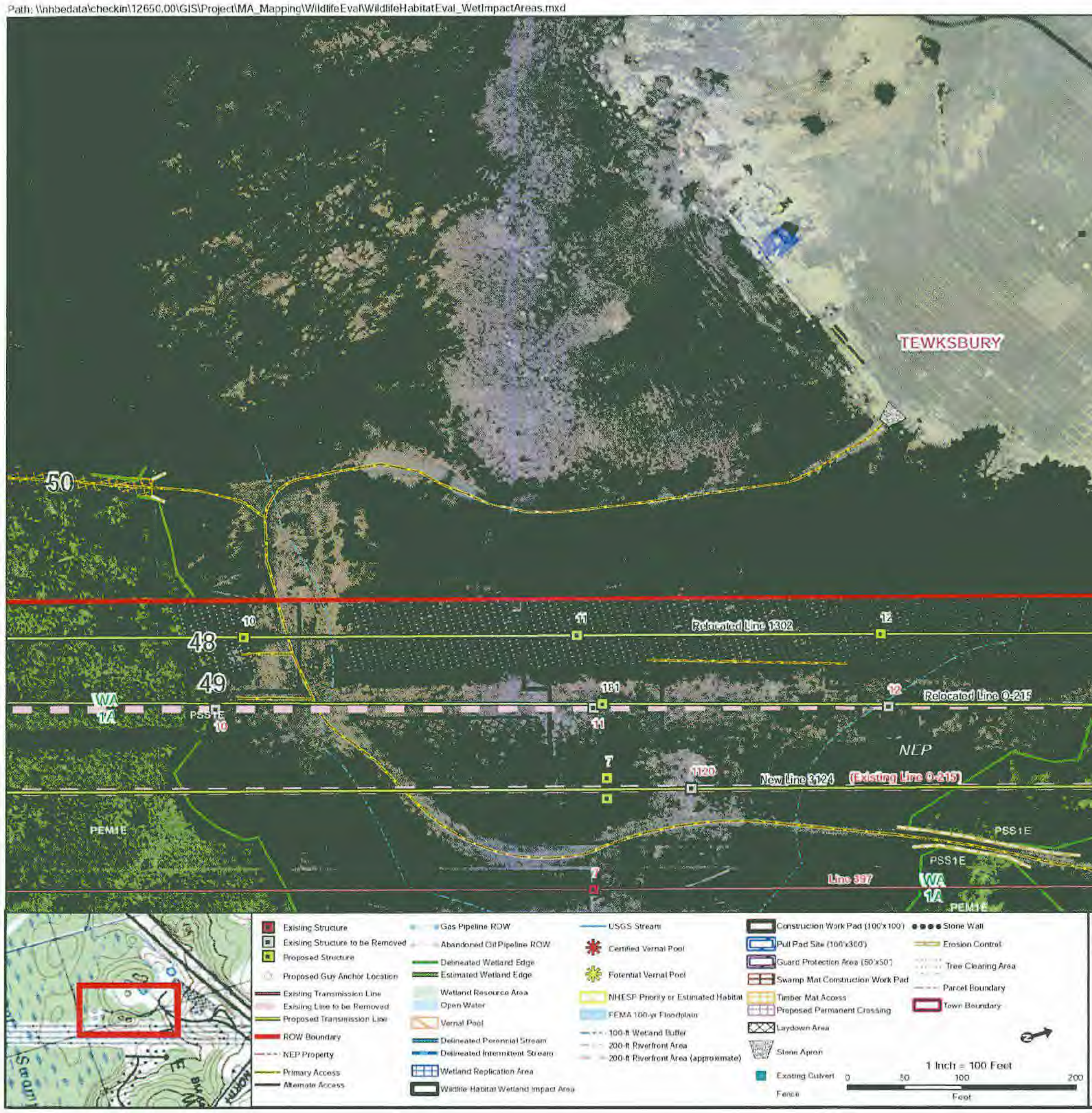

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Wetland Impact Areas

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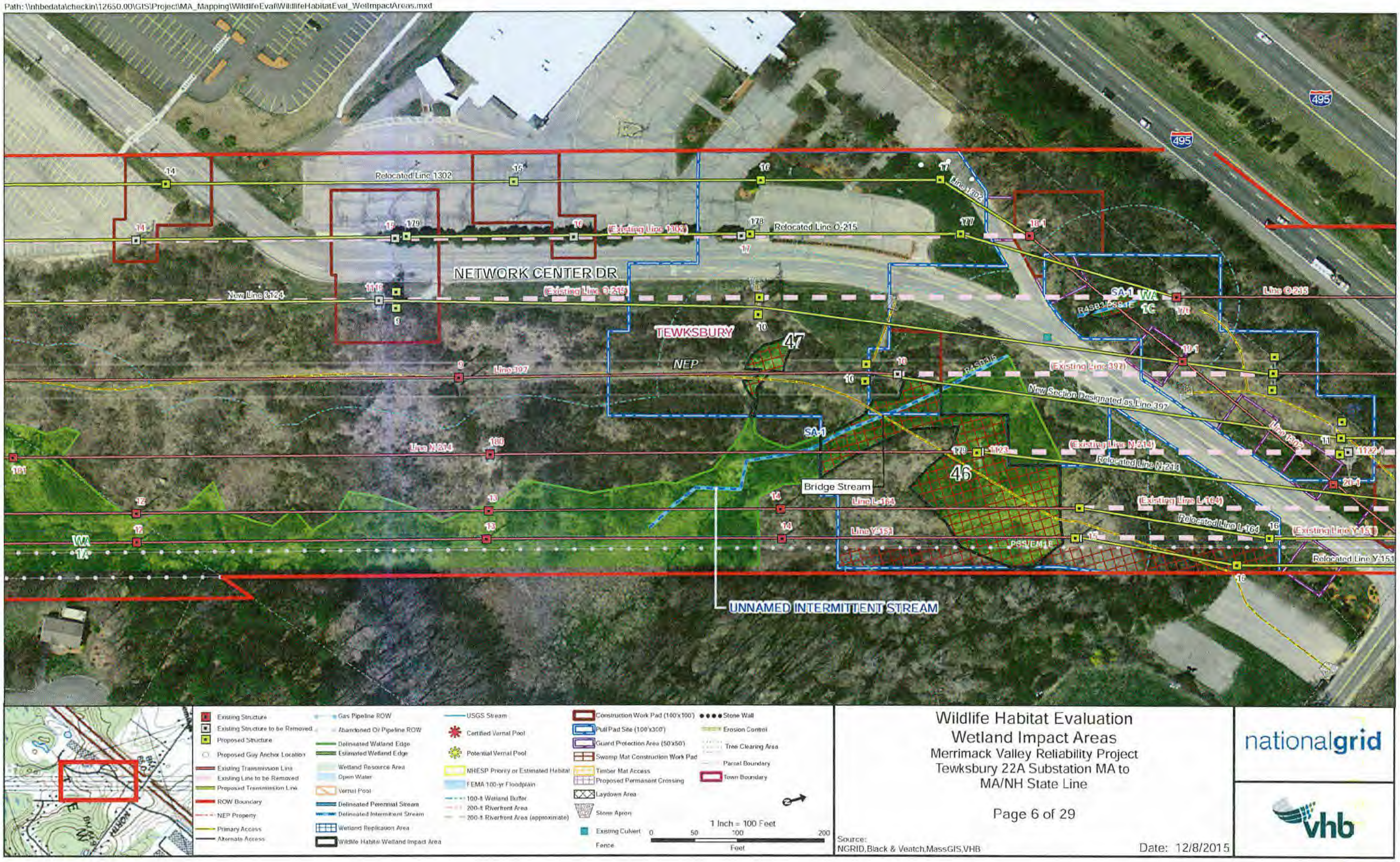

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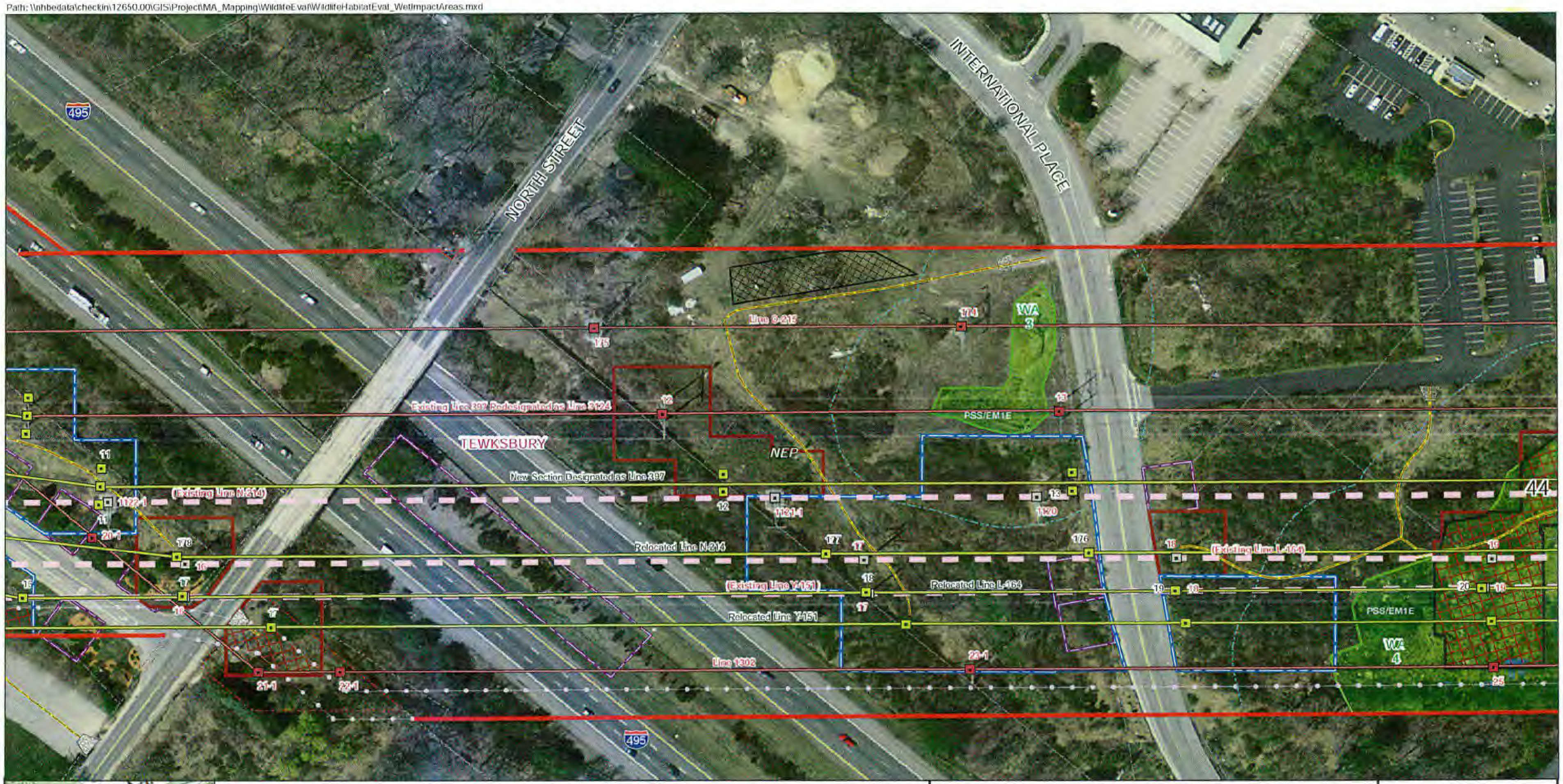

Wildlife Habitat Evaluation
Wetland Impact Areas

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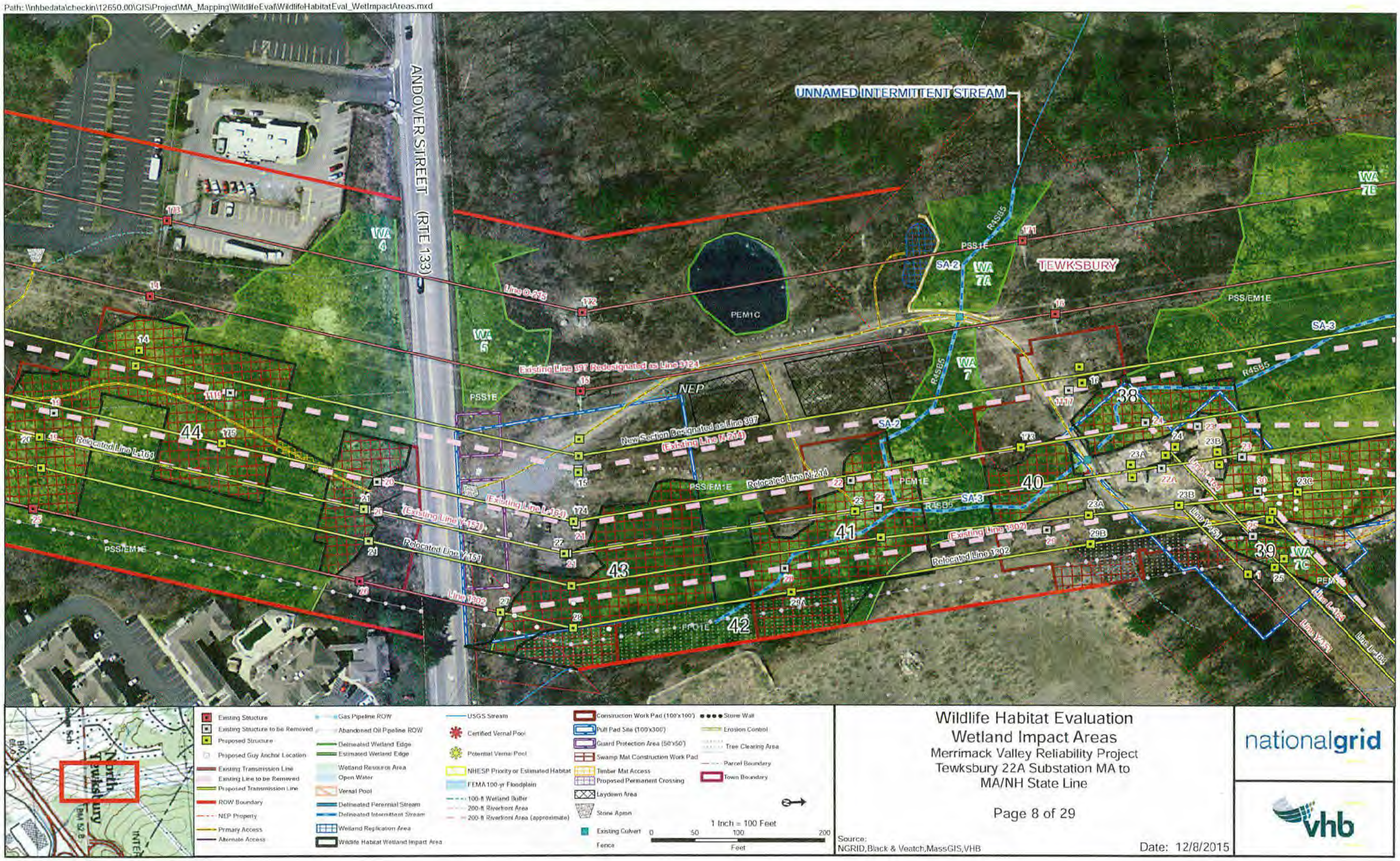

Wildlife Habitat Evaluation
Wetland Impact Areas

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
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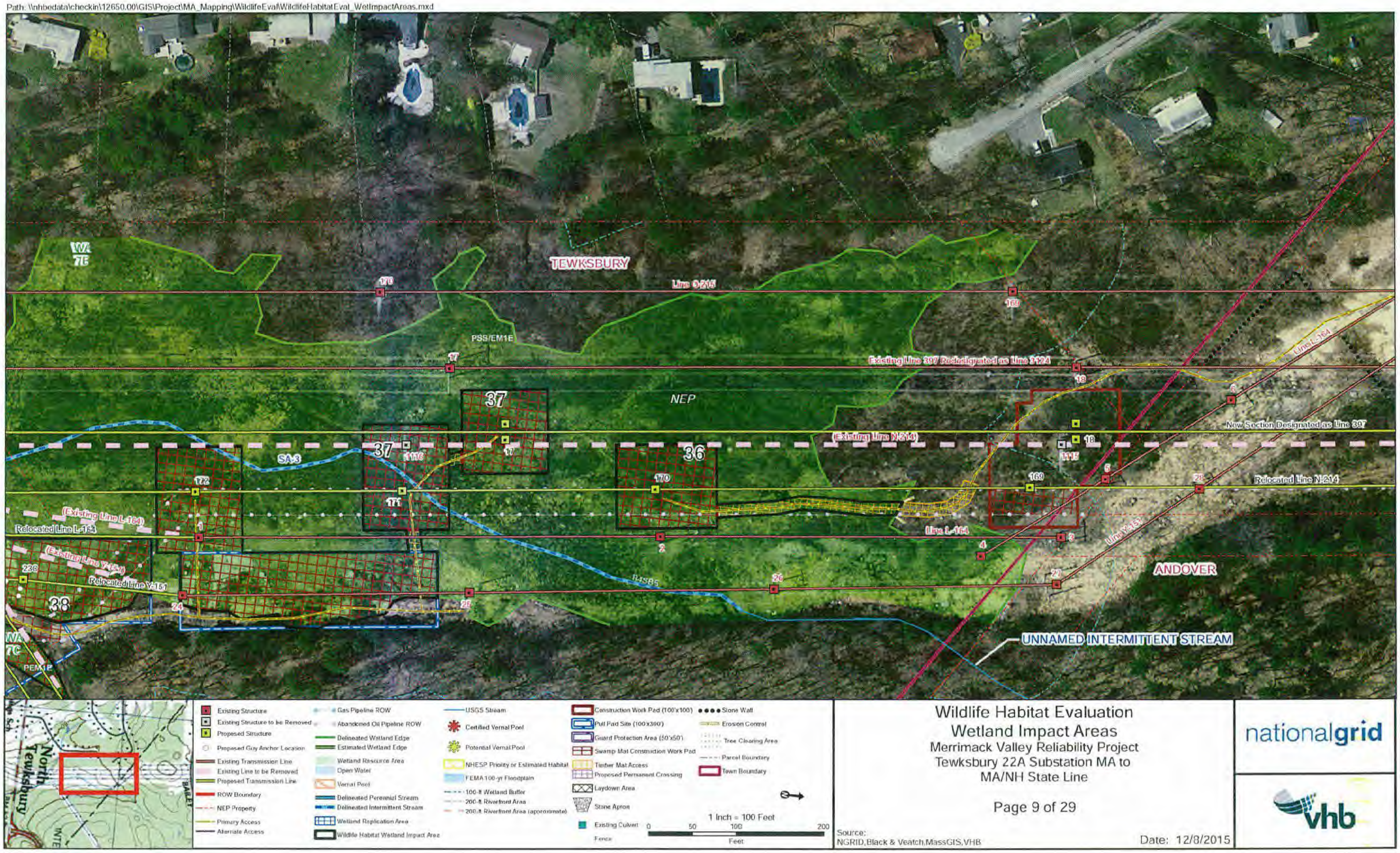

Wildlife Habitat Evaluation
Wetland Impact Areas

Merrimack Valley Reliability Project
Tewksbury 22A Substation MA to
MA/NH State Line

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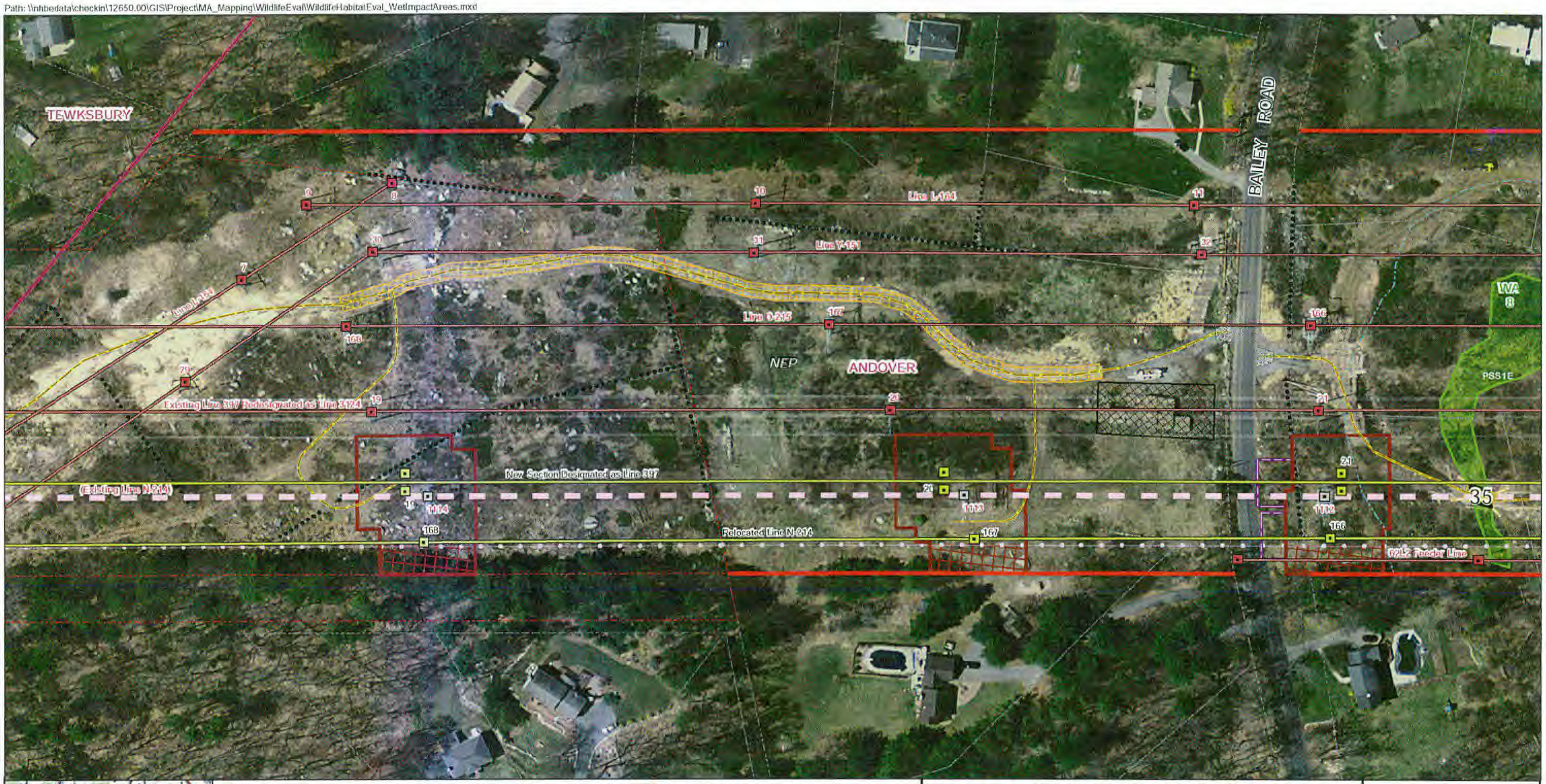

Wildlife Habitat Evaluation
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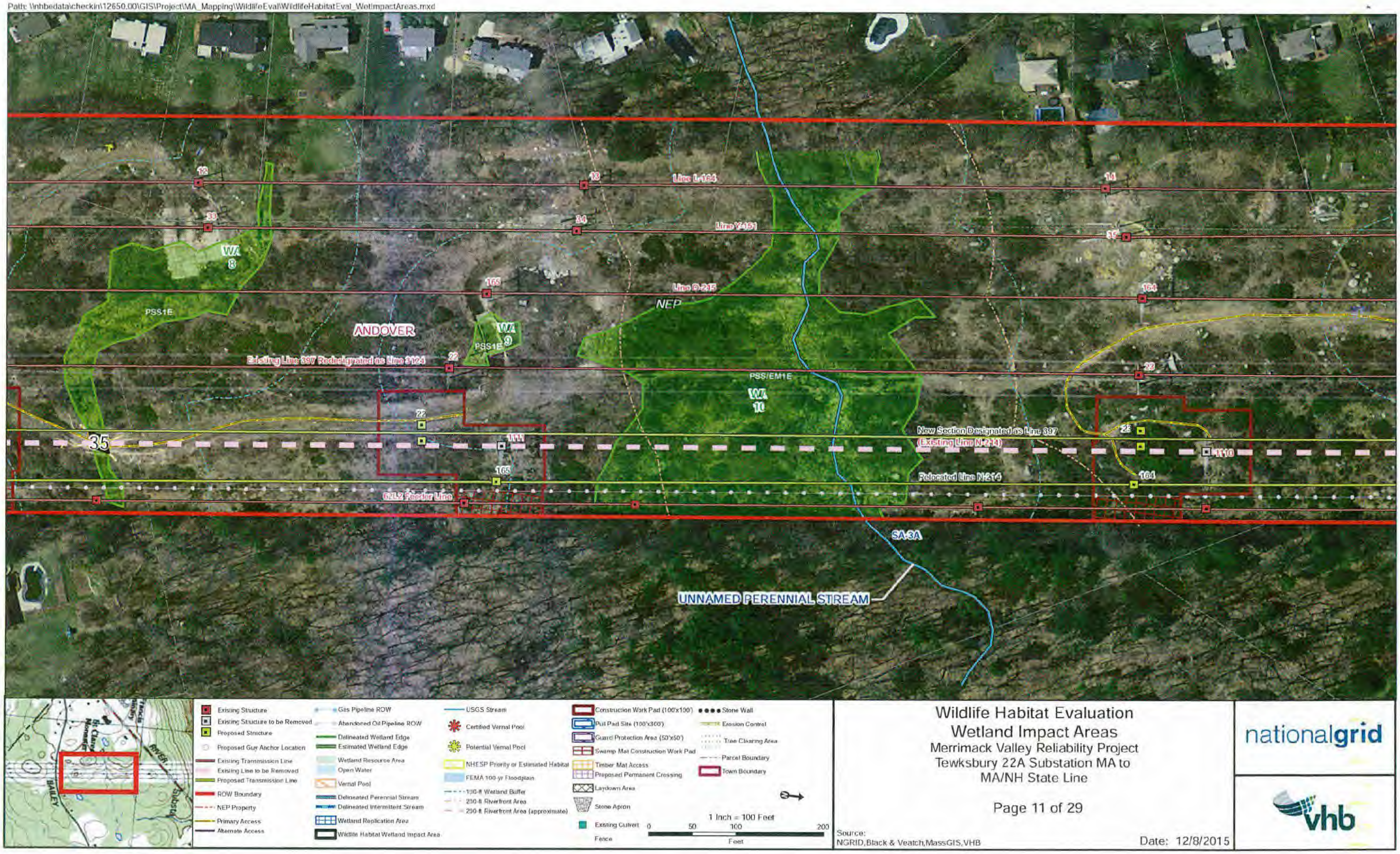

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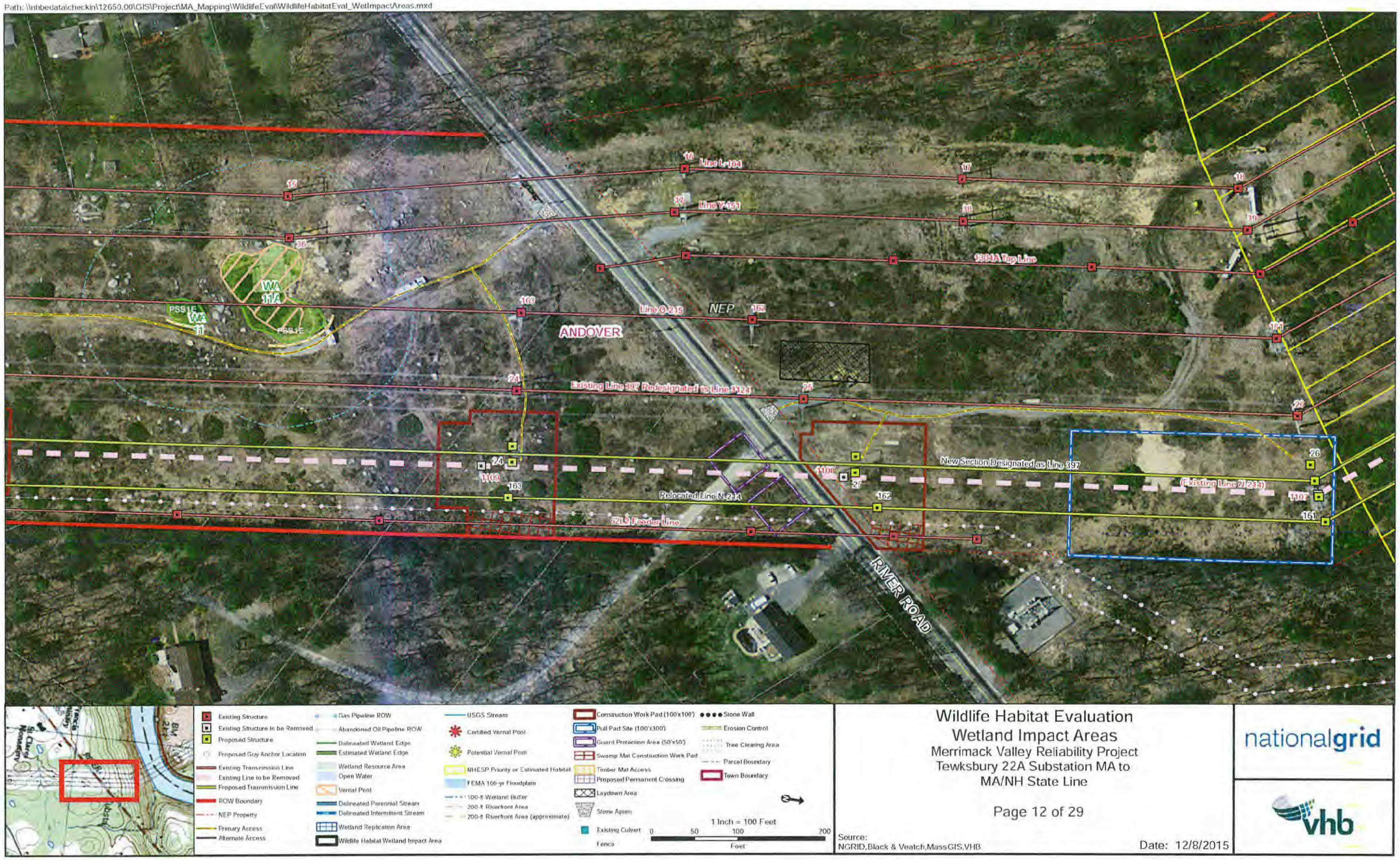

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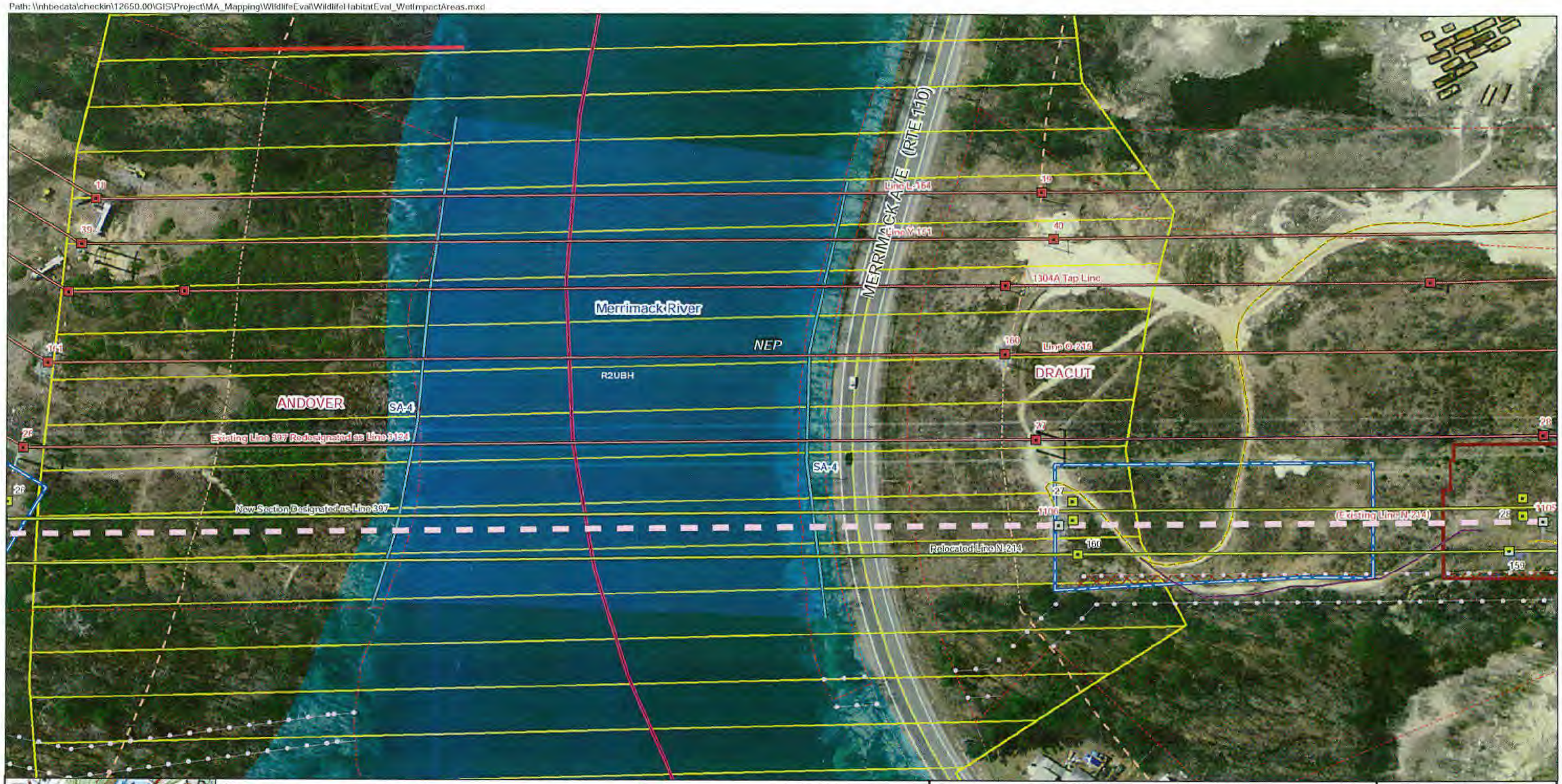

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1 Inch = 100 Feet

0 50 100 200

Feet

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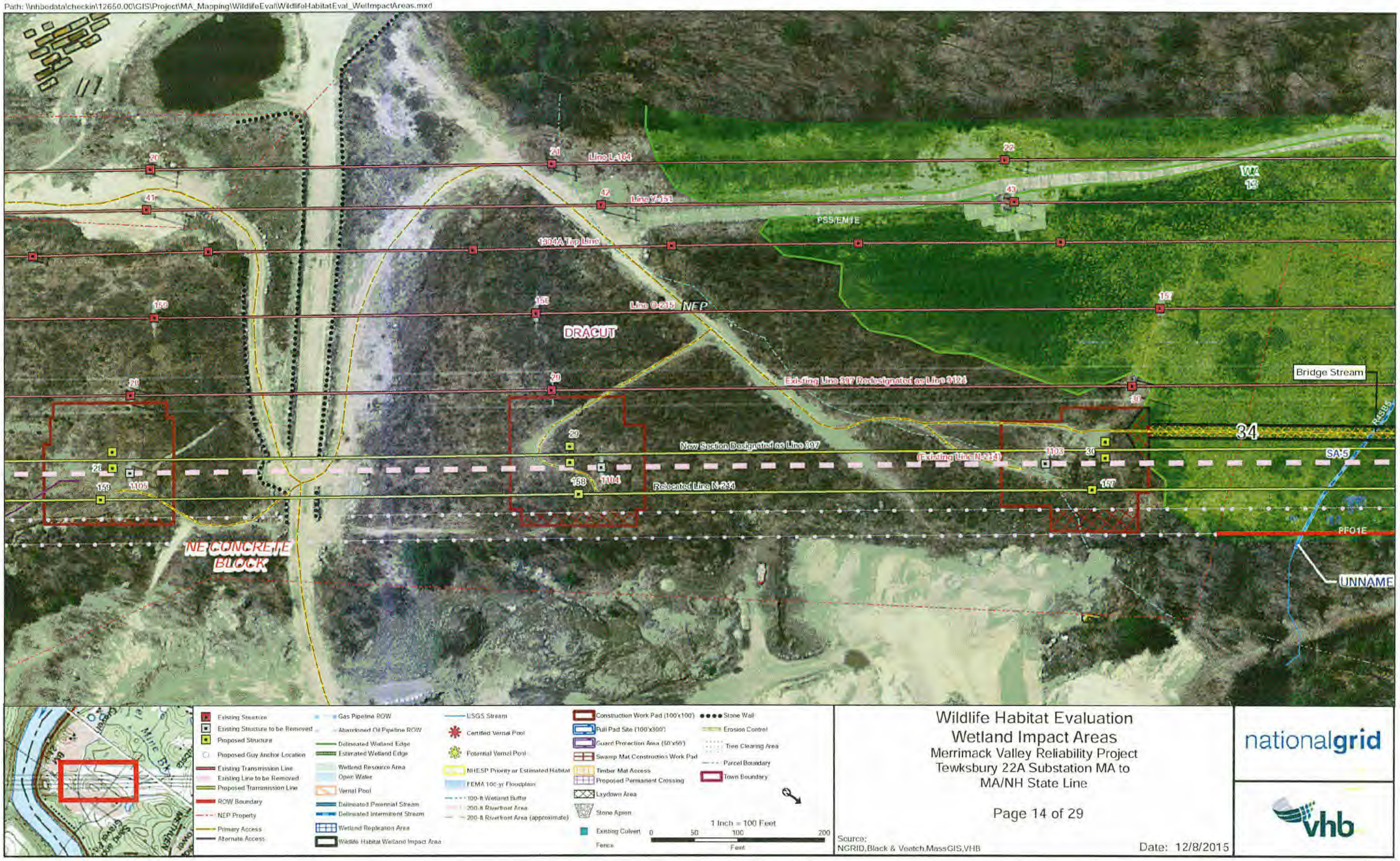

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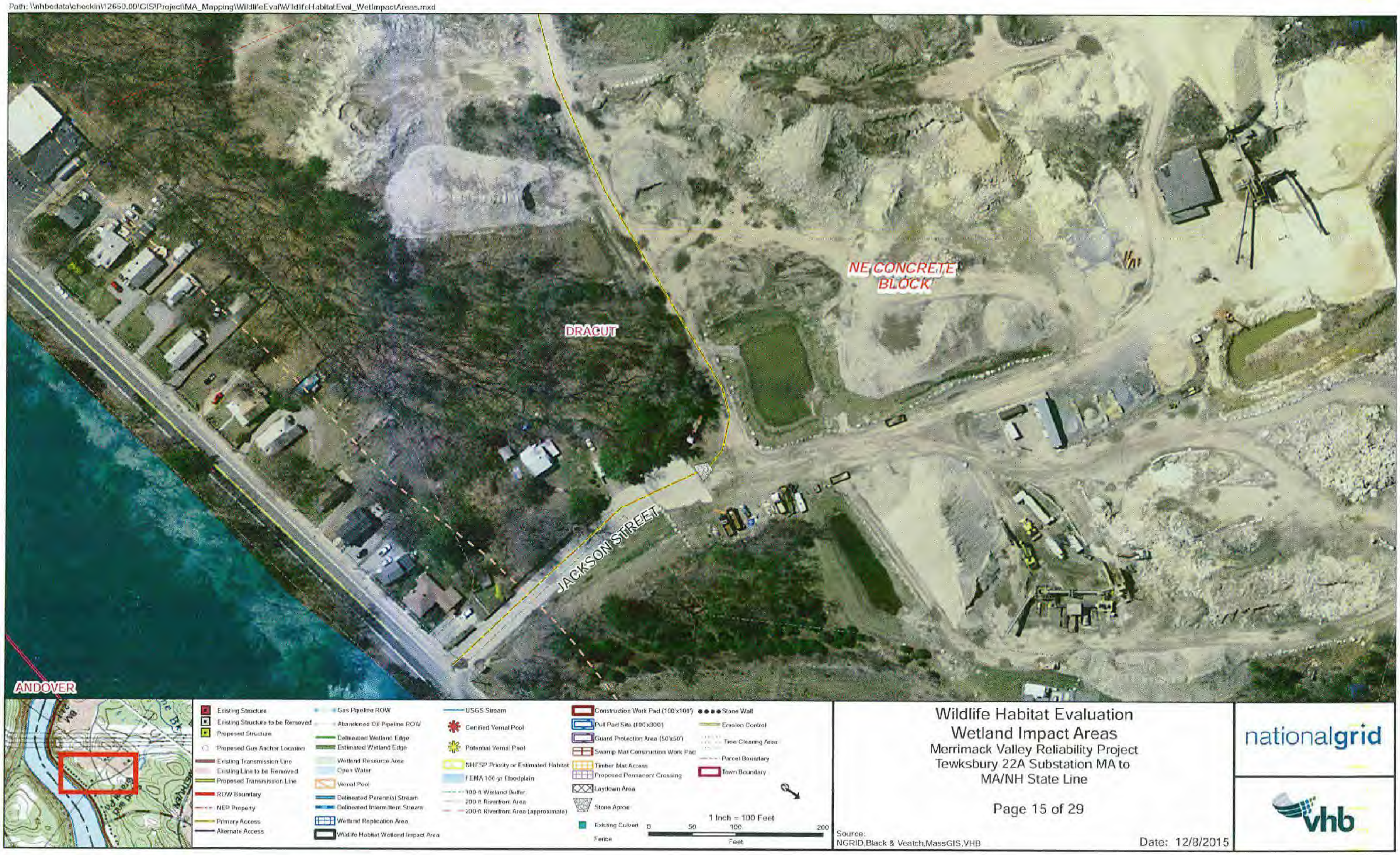

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0 50 100 200
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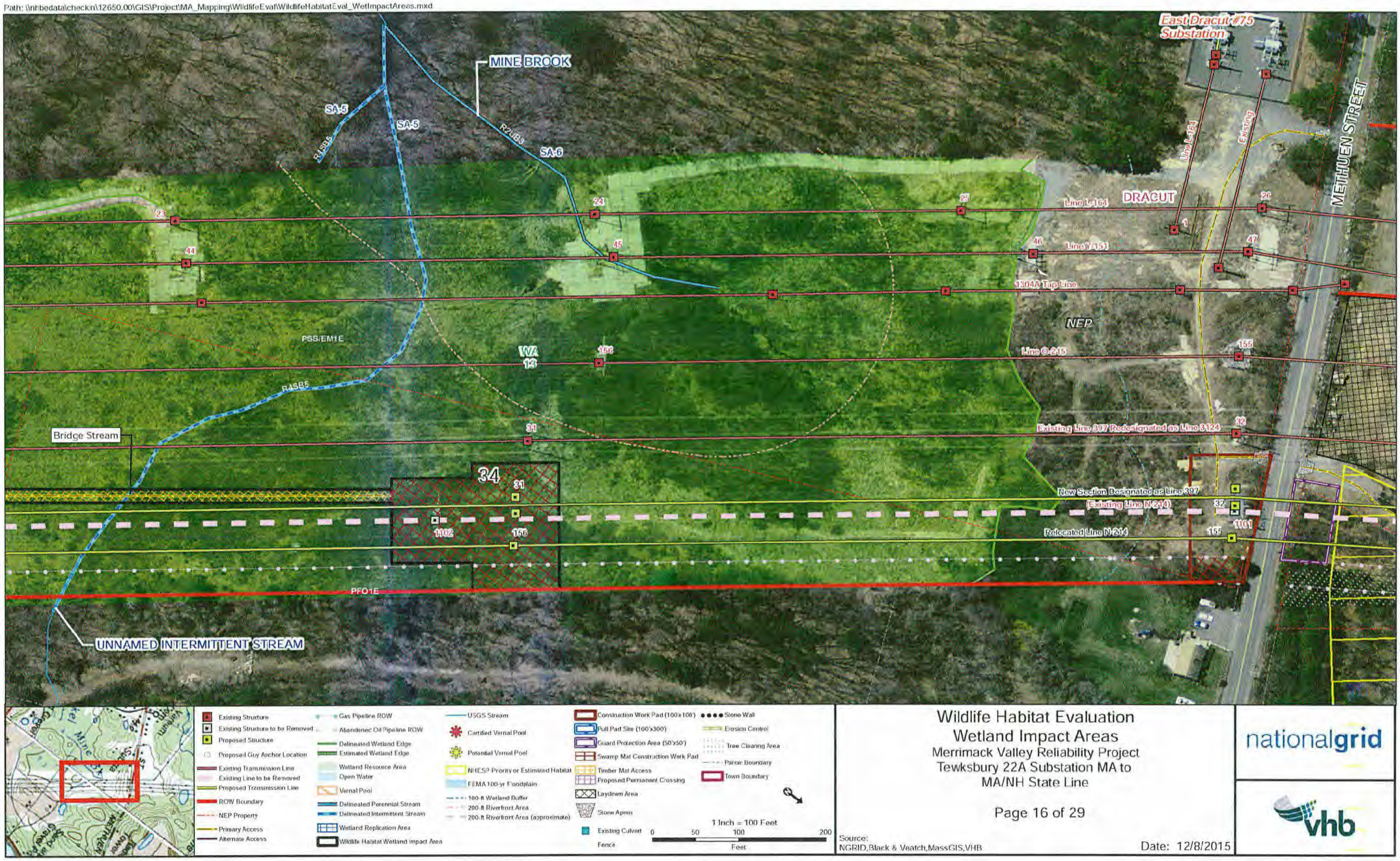

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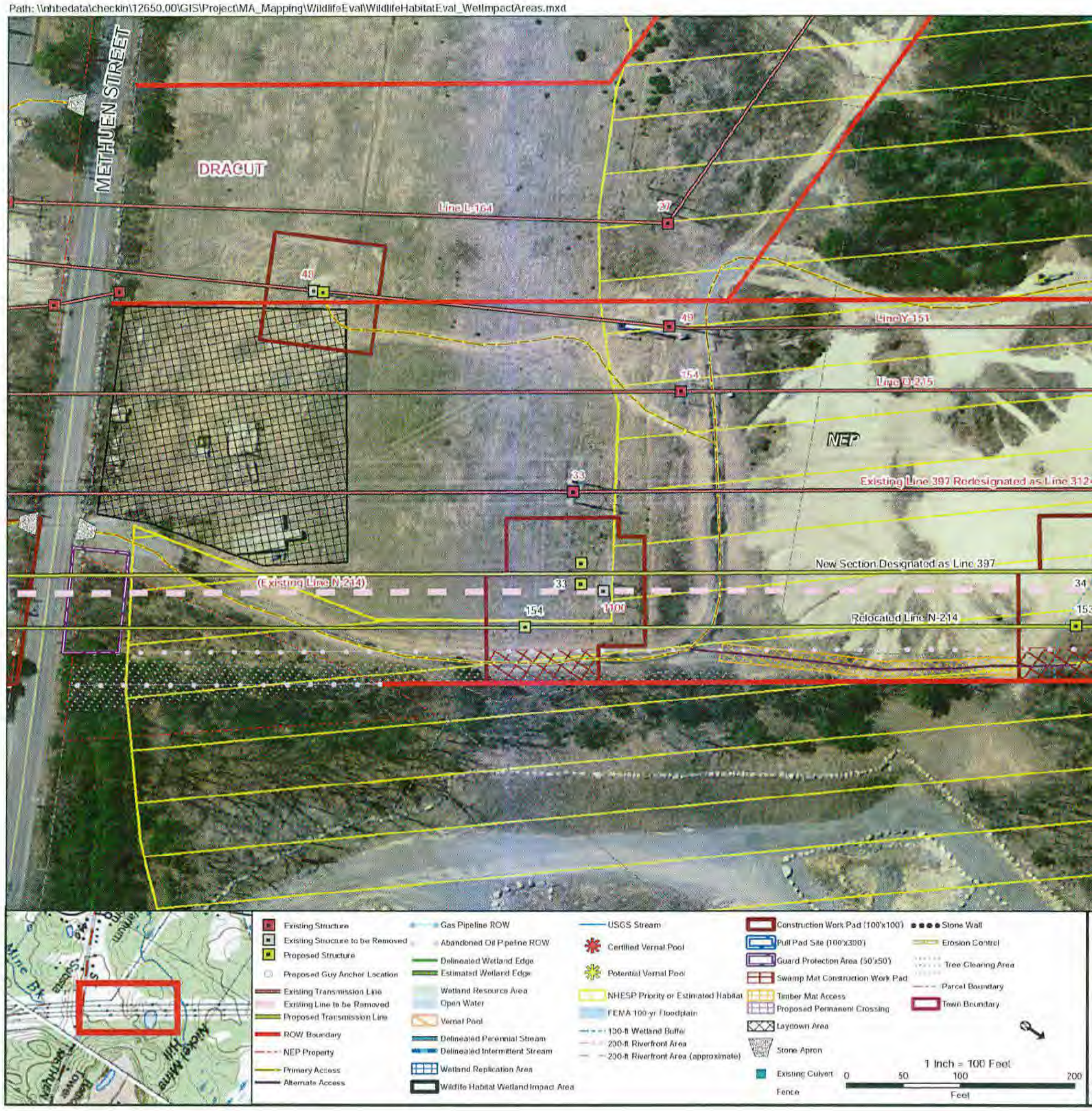

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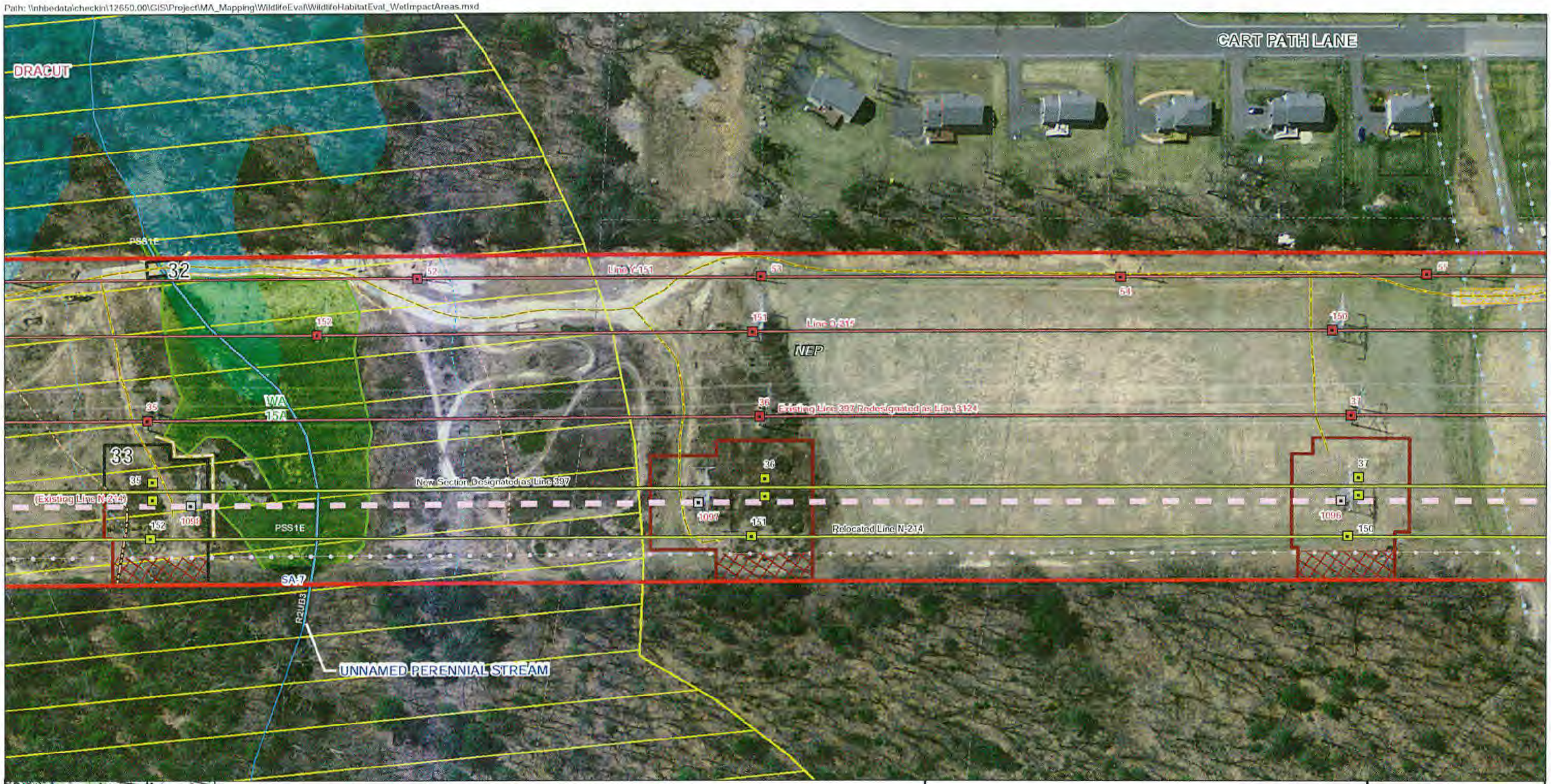

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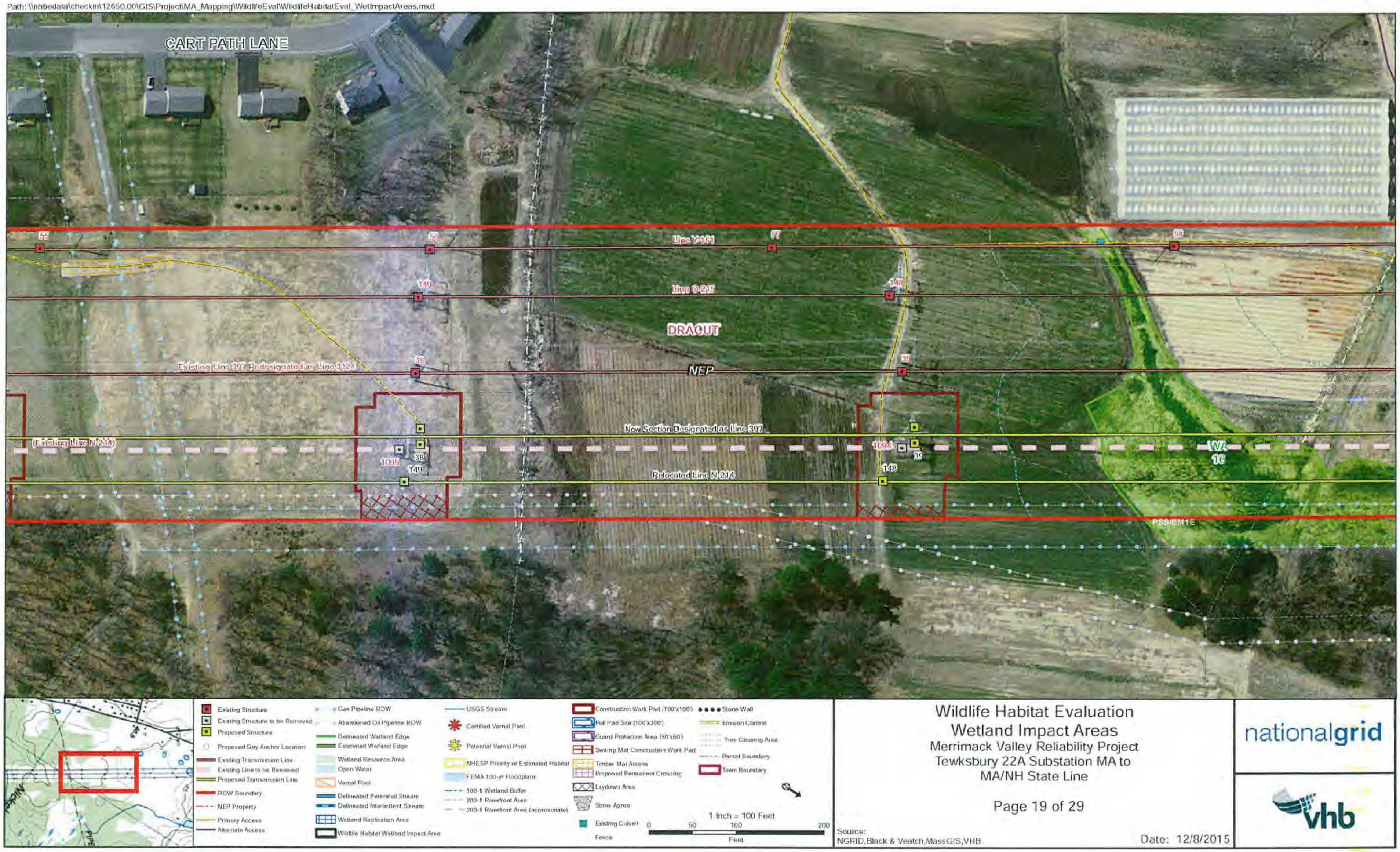

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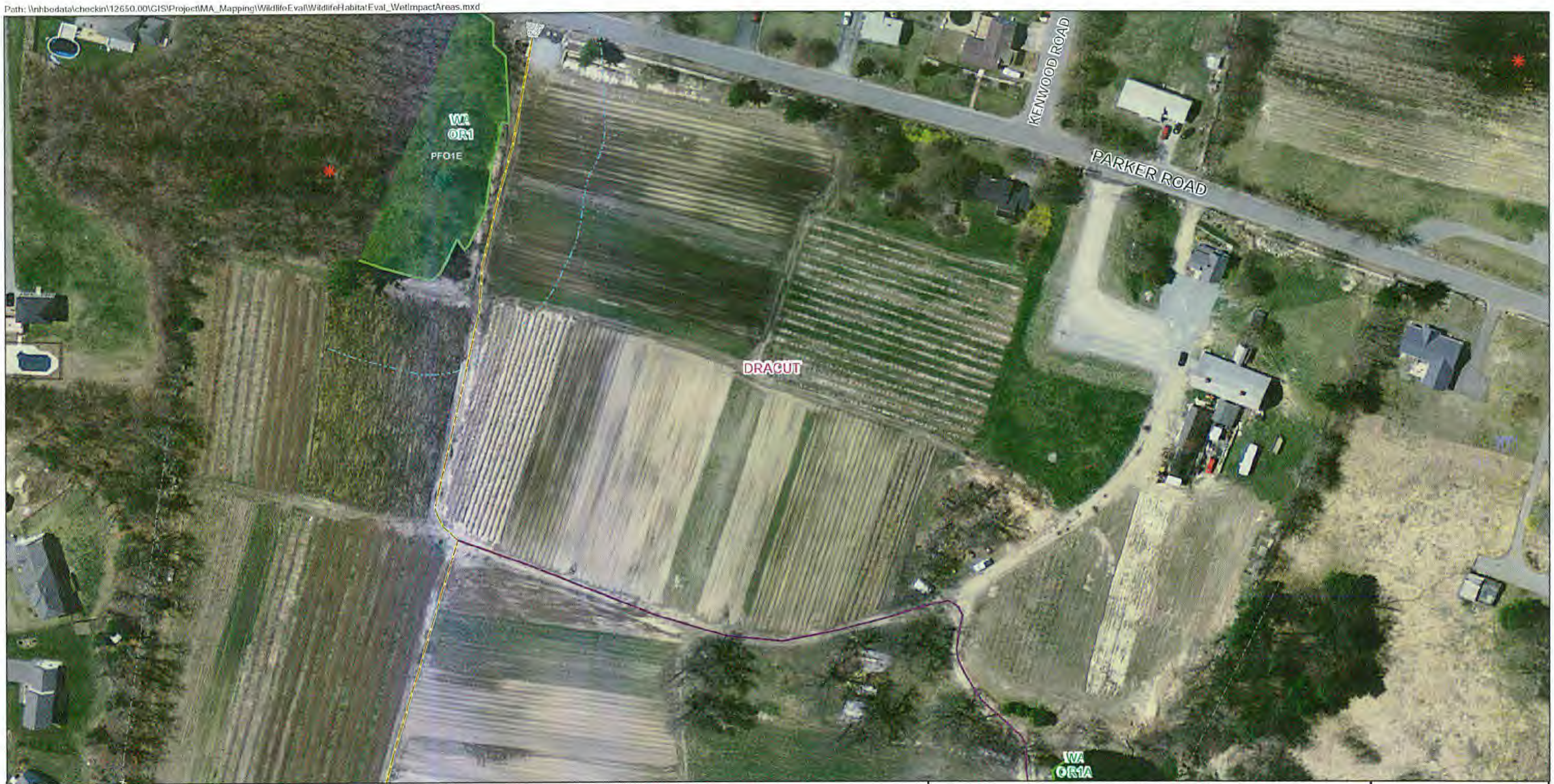

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0 50 100 200
Feet

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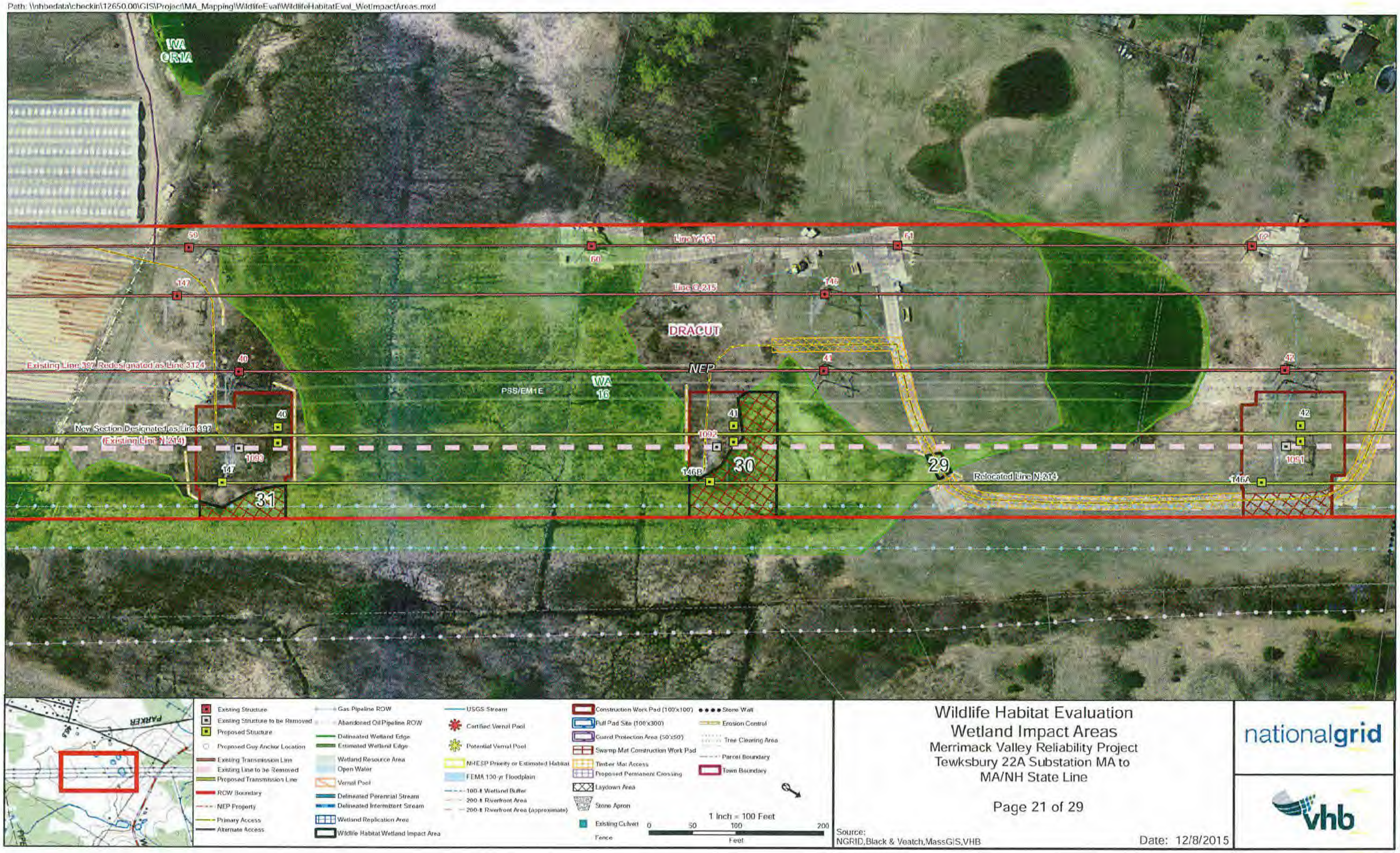

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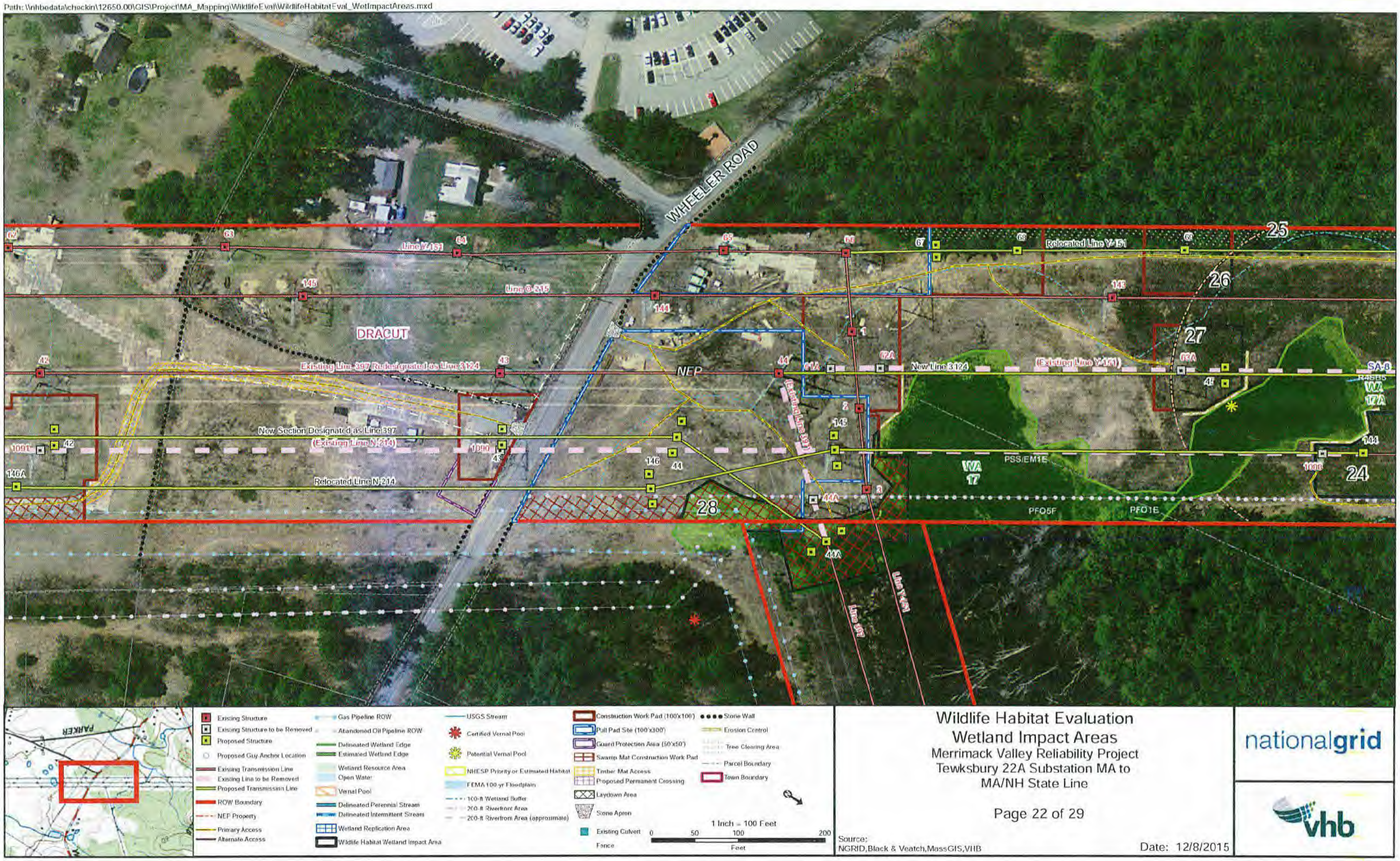

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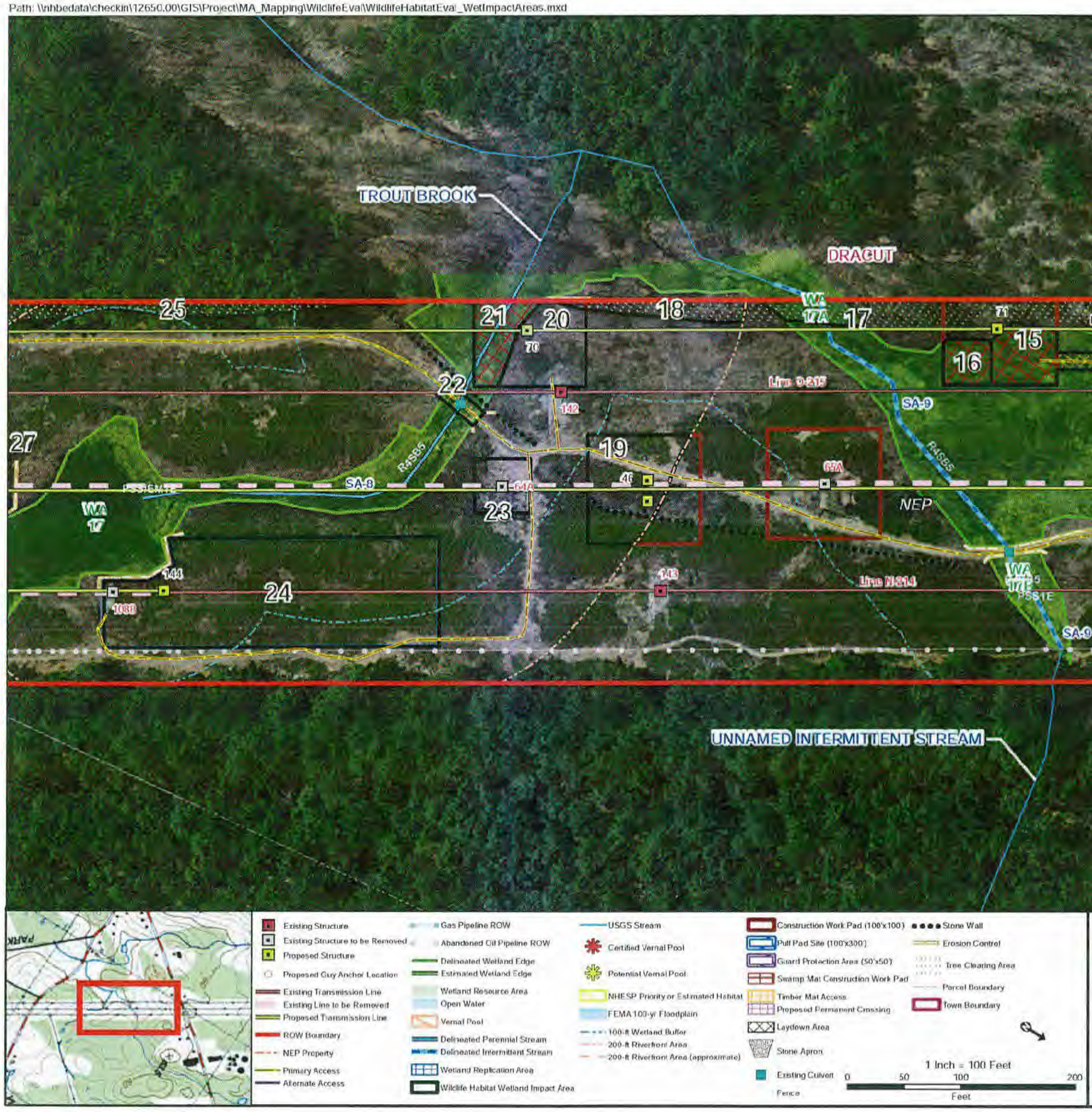

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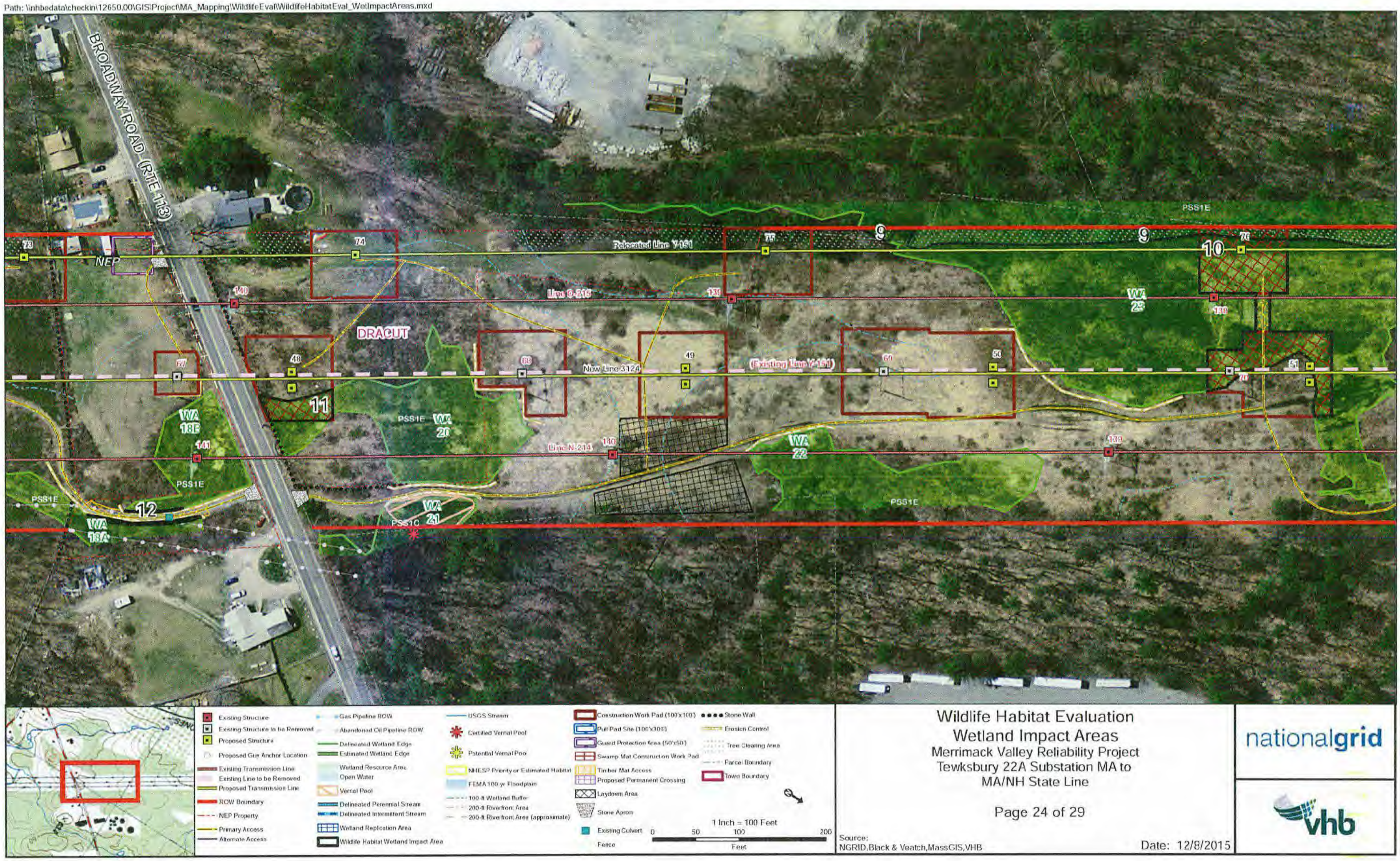

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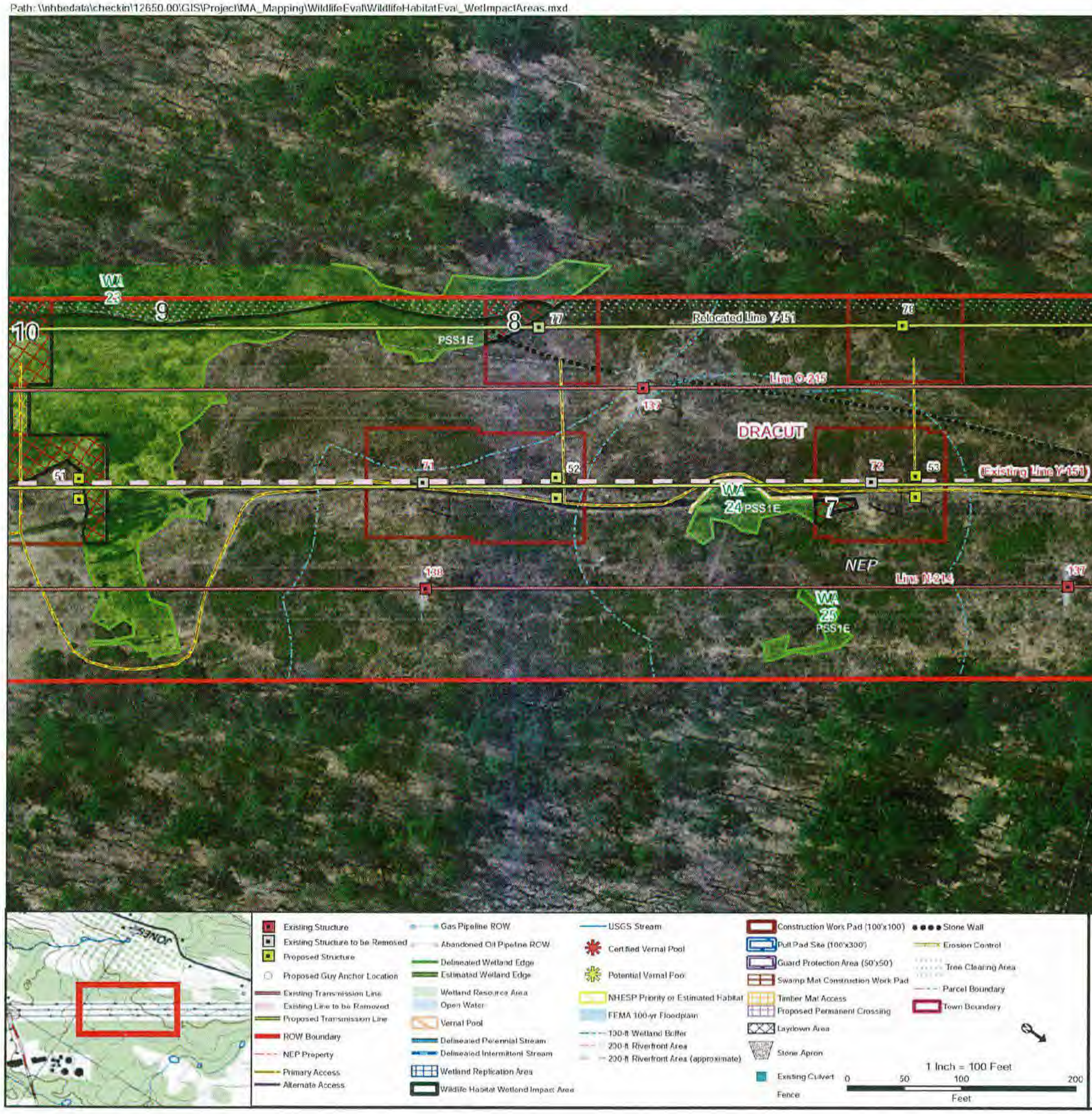

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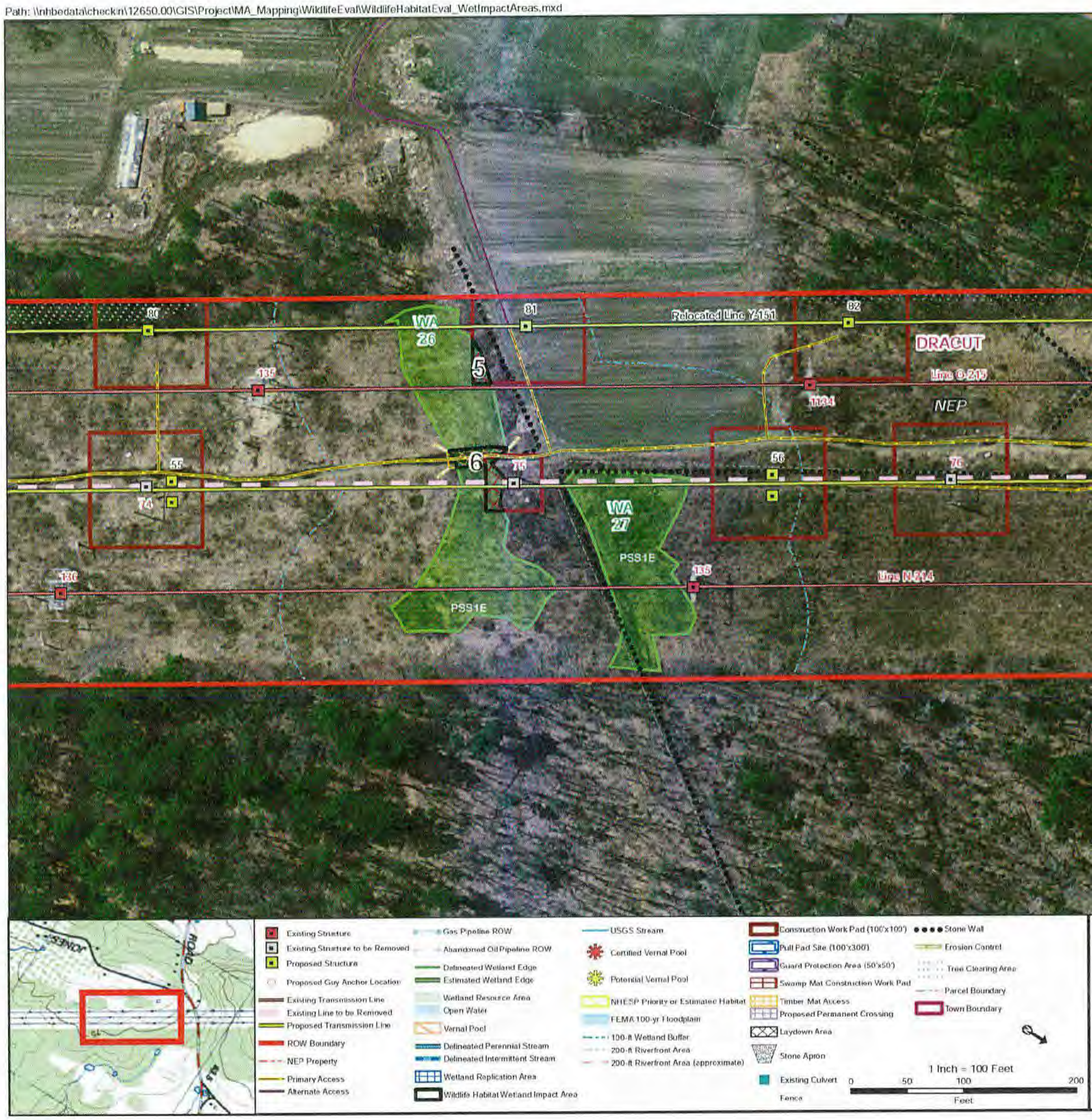

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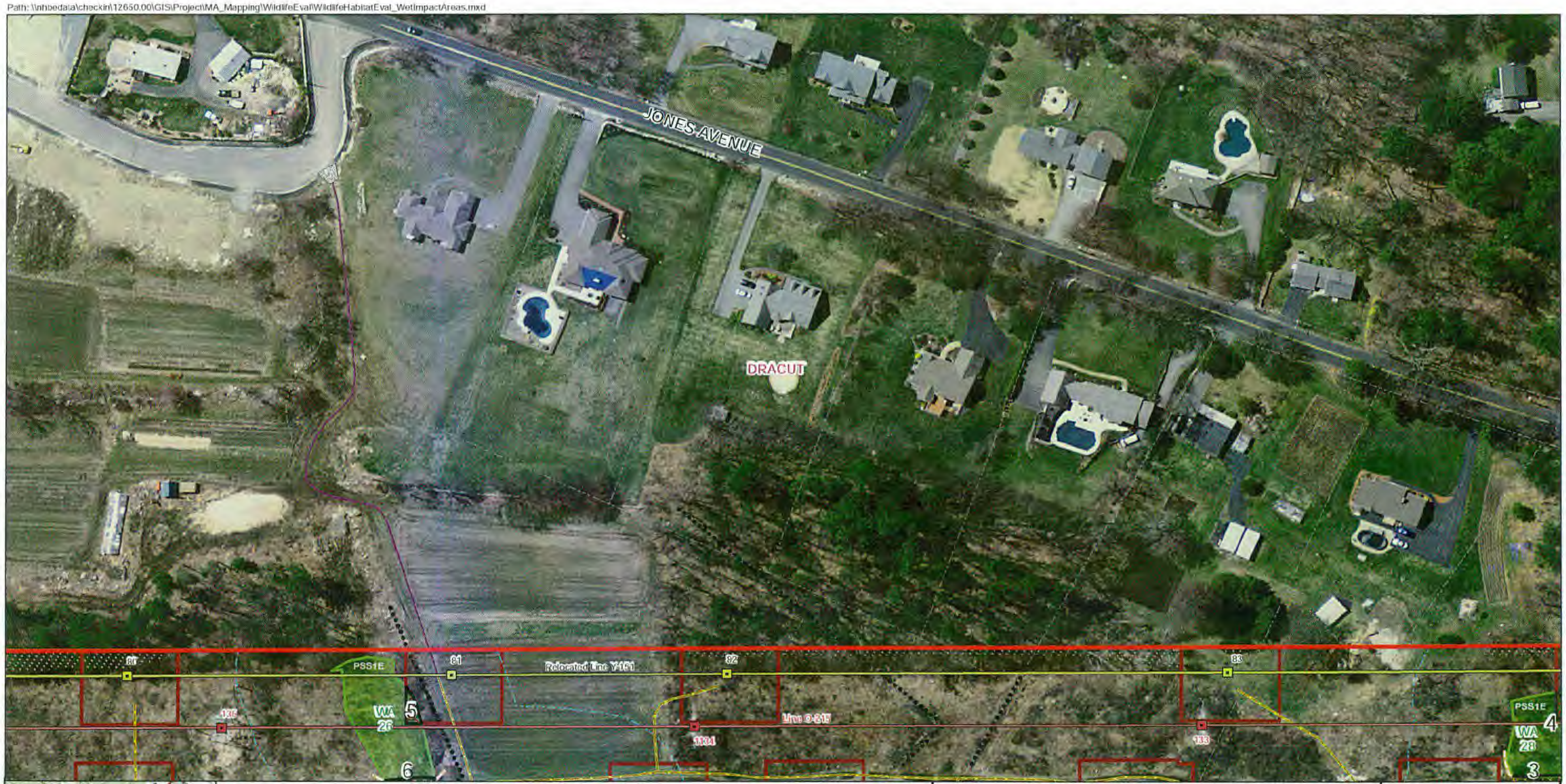

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1 Inch = 100 Feet

0 50 100 200

Feet

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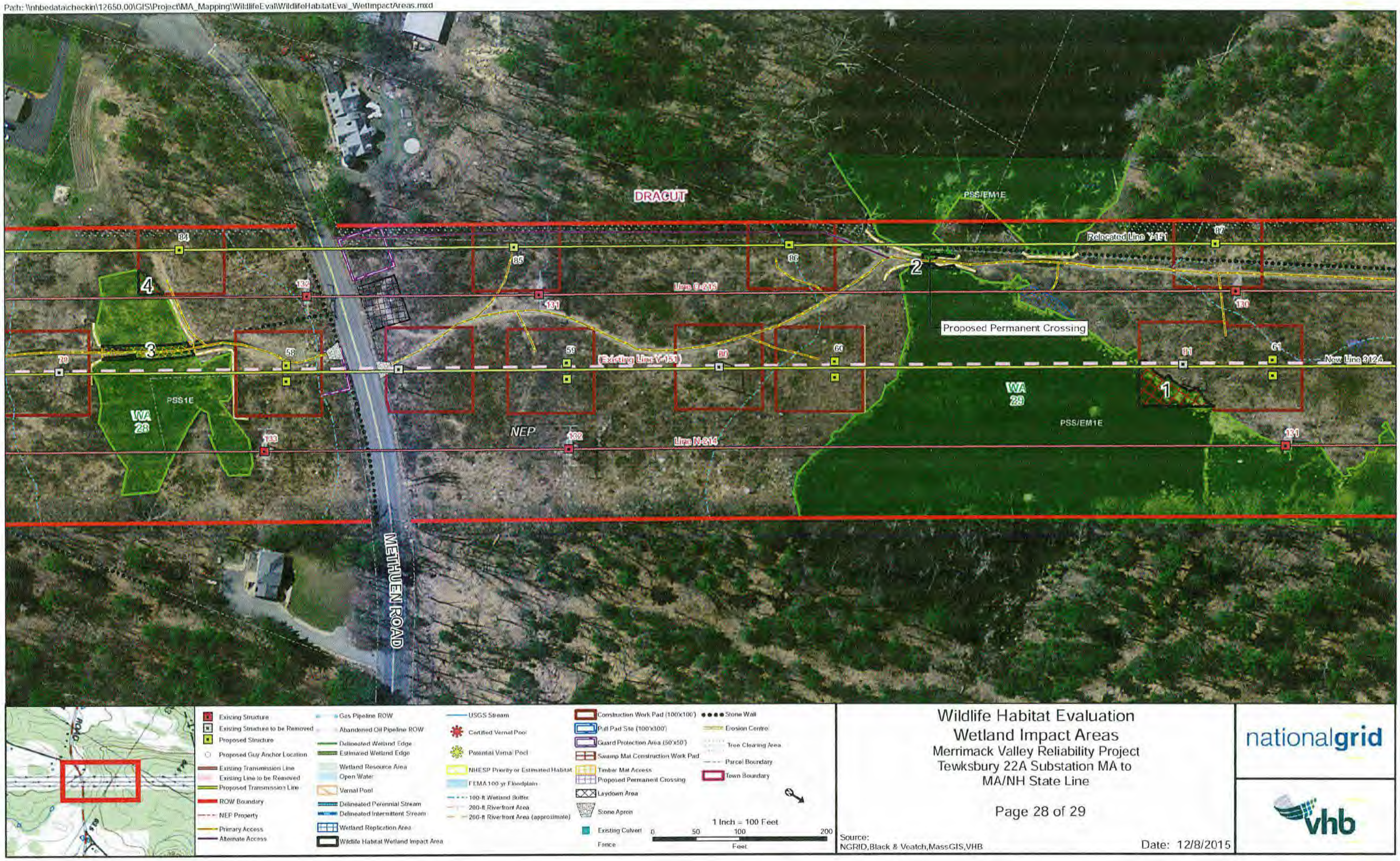

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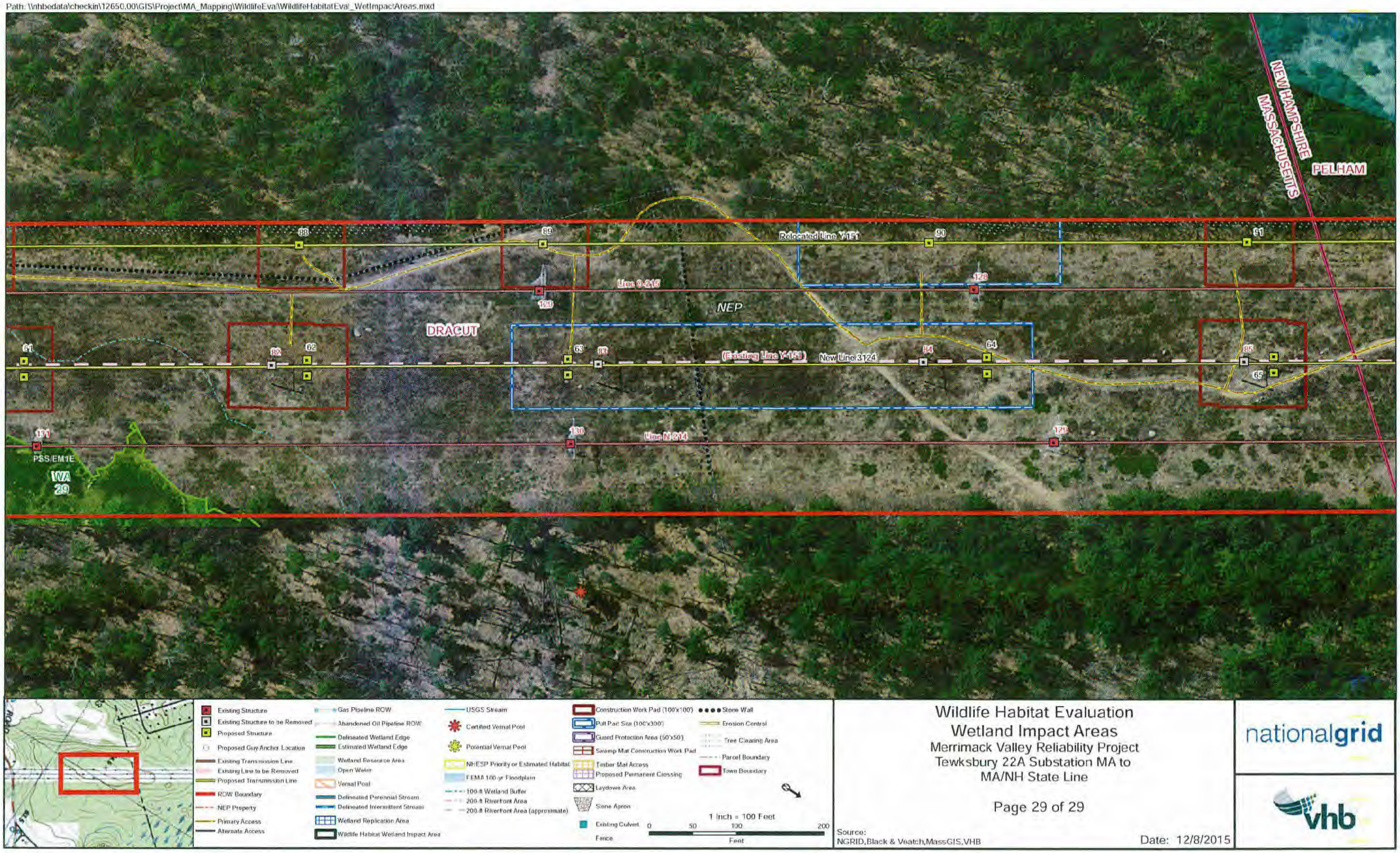

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Appendix C:
Tables

Table 10 Food Availability

Habitat Impact Area	Wetland / Aquatic Food	Upland / Wetland Food	Earthworm Habitat*
1	A	A	A
2	A	P	A
3	A	A	A
4	A	A	A
5	A	P	A
6	A	P	A
7	A	P	A
8	A	P	A
9	A	P	A
10	A	A	A
11	A	P	A
12	A	A	A
13	A	A	A
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18	A	P	A
19	A	P	A
20	A	P	A
21	A	A	A
22	A	P	A
23	A	P	A
24	A	P	A
25	A	P	A
26	A	P	A
27	A	P	A
28	A	P	A
29	A	A	A
30	A	P	A
31	A	A	A
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37	A	P	A
38	A	P	A
39	A	P	A
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44	A	P	A
45	A	A	A
46	A	P	A
47	A	A	A
48	A	P	A
49	A	A	A
50	A	P	A
51	A	P	A
52	A	A	A
53	A	P	A
54	A	P	A
54a	A	A	A
55	A	P	A
56	A	A	A
57	A	P	A
58	A	A	A

Legend:
A = Absent
P = Present

Table 11 Nests, Perches, Basking, Cover, and Foraging

Habitat Impact Area	Veery Nesting Habitat	Number of Dead/Live Trees Over 3" DBH	Number/ Density of Standing Dead Trees				Number of tree cavities in trunks of limbs			Small Mammal Burrows	Dense Herbaceous Cover	Large Woody Debris on the Ground	Rocks Crevaces Logs Roots and/or Hummocks Under Water	Rocks Crevaces Logs Roots and/or Hummocks 1m Above Water	Rock Piles, Crevaces, Hollow Logs as Dens for*						Live/Dead Standing Vegetation Overhanging Water	Depression with Potential to be Vernal Pools*	Standing Water During Part of Growing Season for Breeding Amphibians	Standing Water During Part of Growing Season for Non Breeding Amphibian	Standing Water During Part of Growing Season for Turtles	Standing Water During Part of Growing Season for Foraging Waterfowl	Sphagnum Hummocks/Mats and/or Moss Covered Logs Overhanging/Adjacent to Standing Water
			6-12" dbh	12-18" dbh	18-24" dbh	>24" dbh	6-12" dbh	12-18" dbh	>18" dbh						Otter	Mink	Porcupine	Bear	Bobcat	Turkey Vulture							
1	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A
2	A	-	-	-	-	-	-	-	-	P	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
3	P	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4	P	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
5	P	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
6	P	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
7	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
8	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
9	A	2	6	4	3	2	48	-	-	Abundant	A	P	A	A	A	A	A	A	A	A	P	A	P	P	A	A	A
10	P	-	-	-	-	-	-	-	-	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
11	P	-	-	-	-	-	-	-	-	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
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18	A	-	-	-	-	-	-	-	-	P	A	P	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A
19	A	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
20	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
21	P	-	-	-	-	-	-	-	-	P	P	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A
22	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
23	A	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
24	A	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
25	A	-	1	-	-	3	-	-	-	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
26	A	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
27	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
28	A	-	-	-	-	-	-	-	-	P	P	A	P	P	A	A	A	A	A	P	A	A	P	P	P	P	P
29	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A
30	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	P	A	P	P	P	P	A
31	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	P	P	P	P	A
32	A	-	-	-	-	-	-	-	-	P	P	A	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A
33	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
34	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
35	A	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
36	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
37	P	-	-	-	-	-	-	-	-	P	P	A	A	P	A	A	A	A	A	A	A	A	P	P	P	P	A
38	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A
39	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
40	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	P	A	A	A	P	P	A	P

Table 11 Nests, Perches, Basking, Cover, and Foraging

Habitat Impact Area	Veery Nesting Habitat	Number of Dead/Live Trees Over 3" DBH	Number/ Density of Standing Dead Trees				Number of tree cavities in trunks of limbs			Small Mammal Burrows	Dense Herbaceous Cover	Large Woody Debris on the Ground	Rocks Crevaces Logs Roots and/or Hummocks Under Water	Rocks Crevaces Logs Roots and/or Hummocks 1m Above Water	Rock Piles, Crevaces, Hollow Logs as Dens for*						Live/Dead Standing Vegetation/ Overhanging Water	Depression with Potential to be Vernal Pools*	Standing Water During Part of Growing Season for Breeding Amphibians	Standing Water During Part of Growing Season for Non-Breeding Amphibian	Standing Water During Part of Growing Season for Turtles	Standing Water During Part of Growing Season for Foraging Waterfowl	Sphagnum Hummocks/Mats and/or Moss Covered Logs Overhanging/Adjacent to Standing Water
			6-12" dbh	12-18" dbh	18-24" dbh	>24" dbh	6-12" dbh	12-18" dbh	>18" dbh						Otter	Mink	Porcupine	Bear	Bobcat	Turkey Vulture							
41	P	-	-	-	-	-	-	-	-	P	P	A	A	P	A	A	A	A	A	A	A	A	A	P	P	A	A
42	A	2	13	5	-	-	8	6	-	P	A	P	P	P	A	A	A	A	A	A	A	P	A	P	P	A	A
43	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A
44	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A
45	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
46	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A
47	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A
48	A	-	1	-	-	-	15	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A
49	A	-	5	-	6	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	P
50	P	5	-	-	-	-	7	-	-	P	P	P	A	A	A	A	A	A	A	A	A	A	P	P	P	P	A
51	A	-	5	-	-	-	6	-	-	P	P	P	A	A	A	A	A	A	A	A	A	A	P	P	P	P	A
52	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A
53	A	2	6	-	-	-	2	1	-	P	A	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
54	P	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	P	A	A	P	P	P	P	A
54a	A	-	-	-	-	-	-	-	-	P	P	A	A	A	A	A	A	A	A	A	A	A	P	P	P	A	A
55	A	2	8	2	-	-	25		1	P	A	P	P	P	A	P	P	A		A	P	P	P	P	P	P	P
56	A	-	55*	-	-	-	U	U	U	P	P	P	A	A	A	A	A	A	A	A	P	A	P	P	P	P	A
57	-	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	P	P	A	A	A
58	A	-	-	-	-	-	-	-	-	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Legend:
A = Absent
P = Present

Table 12 Important Habitat Characteristics

Habitat Impact Area	Medium/Large flat rocks within stream	Flat rocks and logs on Bank or within exposed portion of streambed	Fine Silt/Clay Under Water Banks	Overhanging Banks	Vertical Sandy Banks	Areas of Ice-free Water in Winter	Mudflats	Exposed Areas of Well-Drained Soils
1	A	A	A	A	A	A	A	A
2	A	A	A	A	A	A	A	A
3	A	A	A	A	A	A	A	A
4	A	A	A	A	A	A	A	A
5	A	A	A	A	A	A	A	A
6	A	A	A	A	A	A	A	A
7	A	A	A	A	A	A	A	A
8	A	A	A	A	A	A	A	A
9	A	A	A	A	A	A	A	A
10	A	A	A	A	A	A	A	A
11	A	A	A	A	A	A	A	A
12	A	A	A	A	A	A	A	A
13	A	A	A	A	A	A	A	A
14	A	A	A	A	A	A	A	A
15	A	A	A	A	A	A	A	A
16	A	A	A	A	A	A	A	A
17	A	A	A	P	A	A	A	A
18	A	A	A	A	A	A	A	A
19	A	A	A	A	A	A	A	A
20	A	A	A	A	A	A	A	A
21	A	A	A	P	A	A	A	A
22	A	A	A	A	A	A	A	A
23	A	A	A	A	A	A	A	A
24	A	A	A	A	A	A	A	A
25	A	A	A	A	A	A	A	A
26	A	A	A	A	A	A	A	A
27	A	A	A	A	A	A	A	A
28	A	A	A	A	A	A	A	A
29	A	A	A	A	A	A	A	A
30	A	A	A	A	A	A	A	A
31	A	A	A	A	A	A	A	A
32	A	A	A	A	A	A	A	A
33	A	A	A	A	A	A	A	A
34	A	A	A	A	A	A	A	A
35	A	A	A	A	A	A	A	A
36	A	A	A	A	A	A	A	A
37	A	A	A	A	A	A	A	A
38	A	A	A	A	A	A	A	A
39	A	A	A	A	A	A	A	A
40	A	A	A	A	A	A	A	A
41	A	A	A	A	A	A	A	A
42	P	P	A	P	A	A	A	A
43	A	A	A	A	A	A	A	A
44	A	A	A	A	A	A	A	A
45	A	A	A	A	A	A	A	A
46	A	A	A	A	A	A	A	A
47	A	A	A	A	A	A	A	A
48	A	A	A	A	A	A	A	A
49	A	A	A	A	A	A	A	A
50	A	A	A	A	A	A	A	A
51	A	A	A	A	A	A	A	A
52	A	A	A	A	A	A	A	A
53	A	A	A	A	A	A	A	A
54	A	A	A	A	A	A	A	A
54a	A	A	A	A	A	A	A	A
55	A	A	P	A	A	A	A	A
56	A	A	A	A	A	A	A	A
57	A	A	A	A	A	A	A	A
58	A	A	A	A	A	A	A	A

Legend:
A = Absent
P = Present

Table 13 Wildlife Dens and Nests

Habitat Impact Area	Turtle Nesting Sites	Bank Swallow Colony*	Nests P Within Impact Area*			Dens Within Impact Area*			Project Area is within 100 feet of Beaver, Mink, Otter Dens, Bank Swallow Colony, or Turtle Nesting Site	Project Area is within 200 feet of a Great Blue Heron or Osprey Nests	Project Area is within 1,000 feet of Bald Eagle Nest
			Bald Eagle	Osprey	Great Blue Heron	Otter	Mink	Beaver			
1	A	A	A	A	A	A	A	A	NO	NO	NO
2	A	A	A	A	A	A	A	A	NO	NO	NO
3	A	A	A	A	A	A	A	A	NO	NO	NO
4	A	A	A	A	A	A	A	A	NO	NO	NO
5	A	A	A	A	A	A	A	A	NO	NO	NO
6	A	A	A	A	A	A	A	A	NO	NO	NO
7	A	A	A	A	A	A	A	A	NO	NO	NO
8	A	A	A	A	A	A	A	A	NO	NO	NO
9	A	A	A	A	A	A	A	A	NO	NO	NO
10	A	A	A	A	A	A	A	A	NO	NO	NO
11	A	A	A	A	A	A	A	A	NO	NO	NO
12	A	A	A	A	A	A	A	A	NO	NO	NO
13	A	A	A	A	A	A	A	A	NO	NO	NO
14	A	A	A	A	A	A	A	A	NO	NO	NO
15	A	A	A	A	A	A	A	A	NO	NO	NO
16	A	A	A	A	A	A	A	A	NO	NO	NO
17	A	A	A	A	A	A	A	A	NO	NO	NO
18	A	A	A	A	A	A	A	A	NO	NO	NO
19	A	A	A	A	A	A	A	A	NO	NO	NO
20	A	A	A	A	A	A	A	A	NO	NO	NO
21	A	A	A	A	A	A	A	A	NO	NO	NO
22	A	A	A	A	A	A	A	A	NO	NO	NO
23	A	A	A	A	A	A	A	A	NO	NO	NO
24	A	A	A	A	A	A	A	A	NO	NO	NO
25	A	A	A	A	A	A	A	A	NO	NO	NO
26	A	A	A	A	A	A	A	A	NO	NO	NO
27	A	A	A	A	A	A	A	A	NO	NO	NO
28	A	A	A	A	A	A	A	A	NO	NO	NO
29	A	A	A	A	A	A	A	A	NO	NO	NO
30	A	A	A	A	A	A	A	A	NO	NO	NO

Habitat Impact Area	Turtle Nesting Sites	Bank Swallow Colony	Nests Within Impact Area*			Dens Within Impact Area*			Project Area is within 100 feet of Beaver, Mink, Otter Dens, Bank Swallow Colony, or Turtle Nesting Site*	Project Area is within 200 feet of a Great Blue Heron or Osprey Nests*	Project Area is within 1,000 feet of Bald Eagle Nest*
			Bald Eagle	Osprey	Great Blue Heron	Otter	Mink	Beaver			
31	A	A	A	A	A	A	A	A	NO	NO	NO
32	A	A	A	A	A	A	A	A	NO	NO	NO
33	P	A	A	A	A	A	A	A	NO	NO	NO
34	A	A	A	A	A	A	A	A	NO	NO	NO
35	A	A	A	A	A	A	A	A	NO	NO	NO
36	A	A	A	A	A	A	A	A	NO	NO	NO
37	A	A	A	A	A	A	A	A	NO	NO	NO
38	A	A	A	A	A	A	A	A	NO	NO	NO
39	A	A	A	A	A	A	A	A	NO	NO	NO
40	A	A	A	A	A	A	A	A	NO	NO	NO
41	A	A	A	A	A	A	A	A	NO	NO	NO
42	A	A	A	A	A	A	A	A	NO	NO	NO
43	A	A	A	A	A	A	A	A	NO	NO	NO
44	A	A	A	A	A	A	A	A	NO	NO	NO
45	A	A	A	A	A	A	A	A	NO	NO	NO
46	A	A	A	A	A	A	A	A	NO	NO	NO
47	A	A	A	A	A	A	A	A	NO	NO	NO
48	A	A	A	A	A	A	A	A	NO	NO	NO
49	A	A	A	A	A	A	A	A	NO	NO	NO
50	A	A	A	A	A	A	A	A	NO	NO	NO
51	A	A	A	A	A	A	A	A	NO	NO	NO
52	A	A	A	A	A	A	A	A	NO	NO	NO
53	A	A	A	A	A	A	A	A	NO	NO	NO
54	A	A	A	A	A	A	A	A	NO	NO	NO
54a	A	A	A	A	A	A	A	A	NO	NO	NO
55	A	A	A	A	A	A	A	A	NO	NO	NO
56	A	A	A	A	A	A	A	A	NO	NO	NO
57	A	A	A	A	A	A	A	A	NO	NO	NO
58	A	A	A	A	A	A	A	A	NO	NO	NO

Legend:
A = Absent
P = Present

Table 14 Emergent Wetlands

Habitat Impact Area	Seasonally Flooded During Growing Season		Persistent Emergent Vegetation		Cattail Emergent Wetland Seasonally		Fine-leafed Emergent Wetland	
	5cm	25cm	5cm	25cm	5cm	25cm	5cm	25cm
1	P	A	P	A	P	A	P	A
2	A	A	A	A	A	A	A	A
3	A	A	A	A	A	A	A	A
4	A	A	A	A	A	A	A	A
5	A	A	A	A	A	A	A	A
6	A	A	A	A	A	A	A	A
7	A	A	A	A	A	A	A	A
8	A	A	A	A	A	A	A	A
9	A	A	A	A	A	A	A	A
10	A	A	A	A	A	A	A	A
11	A	A	A	A	A	A	A	A
12	A	A	A	A	A	A	A	A
13	A	A	A	A	A	A	A	A
14	A	A	A	A	A	A	A	A
15	P	A	A	A	A	A	A	A
16	A	A	A	A	A	A	A	A
17	A	A	A	A	A	A	A	A
18	A	A	A	A	A	A	A	A
19	A	A	A	A	A	A	A	A
20	A	A	A	A	A	A	A	A
21	A	A	A	A	A	A	A	A
22	A	A	A	A	A	A	A	A
23	A	A	A	A	A	A	A	A
24	A	A	A	A	A	A	A	A
25	A	A	A	A	A	A	A	A
26	A	A	A	A	A	A	A	A
27	A	A	A	A	A	A	A	A
28	P	A	P	A	P	A	P	A
29	P	A	A	A	A	A	P	A
30	P	P	P	P	P	P	A	A

Habitat Impact Area	Seasonally Flooded During Growing Season		Persistent Emergent Vegetation		Cattail Emergent Wetland Seasonally		Fine-leafed Emergent Wetland	
	5cm	25cm	5cm	25cm	5cm	25cm	5cm	25cm
31	P	A	P	A	P	A	A	A
32	P	A	P	A	A	A	P	A
33	A	A	A	A	A	A	A	A
34	P	A	P	A	P	A	A	A
35	A	A	A	A	A	A	P	A
36	A	A	A	A	A	A	A	A
37	P	A	P	A	P	A	A	A
38	P	A	P	A	P	A	P	A
39	A	A	A	A	A	A	A	A
40	A	A	A	A	A	A	A	A
41	P	A	P	A	P	A	A	A
42	A	A	A	A	A	A	A	A
43	P	A	P	A	A	A	A	A
44	P	A	P	A	P	A	A	A
45	A	A	A	A	A	A	A	A
46	A	A	A	A	A	A	A	A
47	P	A	P	A	P	A	A	A
48	P	P	P	P	P	P	A	A
49	P	P	P	P	P	P	A	A
50	P	P	P	P	P	P	A	A
51	P	P	P	P	P	P	A	A
52	P	P	P	P	P	P	A	A
53	A	A	A	A	A	A	A	A
54	P	P	P	P	P	P	A	A
54a								
55	A	A	A	A	A	A	A	A
56	P	P	P	P	P	P	A	A
57	P	A	P	A	P	A	A	A
58	A	A	A	A	A	A	A	A

Legend:
A = Absent
P = Present

Table 15 Landscape Context and Habitat Continuity

Habitat Impact Area	Portion of Impact Area Emergent Marsh				Portion of Impact Area Part of Wetland Complex				Portion of Impact Area Part of Contiguous Forest				Includes Grassland Habitat >1 acre	Special Habitat
	1.0 acre	2.0 acres	5.0 acres	10.0 acres	1.0 acre	2.0 acres	5.0 acres	10.0 acres	50 acres	100 acres	250 acres	500 acres		
1	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	N	N
2	N	N	N	N	N	N	N	N	N	N	N	N	N	N
3	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N	N	N	N	N	N	N
7	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
8	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N
9	N	N	N	N	Y	Y	Y	N	Y	Y	N	N	N	N
10	Y	N	N	N	Y	N	N	N	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N	N	N	N	N	N	N
12	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
13	N	N	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	N	N	N	N	N	N	N
16	N	N	N	N	N	N	N	N	N	N	N	N	N	N
17	N	N	N	N	Y	N	N	N	Y	Y	N	N	N	N
18	N	N	N	N	Y	Y	N	N	Y	Y	N	N	N	N
19	N	N	N	N	N	N	N	N	N	N	N	N	N	N
20	N	N	N	N	N	N	N	N	N	N	N	N	N	N
21	N	N	N	N	Y	Y	Y	N	Y	Y	N	N	N	N
22	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
23	N	N	N	N	N	N	N	N	N	N	N	N	N	N
24	N	N	N	N	N	N	N	N	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N	N	N
28	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N	N	N
29	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N
30	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	N	N
31	Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	N	N
32	Y	Y	N	N	Y	Y	N	N	N	N	N	N	N	N
33	N	N	N	N	N	N	N	N	N	N	N	N	N	N
34	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N
35	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N
36	Y	N	N	N	Y	Y	Y	N	N	N	N	N	N	N
37	Y	Y	N	N	Y	Y	Y	N	N	N	N	N	N	N
38	Y	Y	N	N	Y	Y	Y	Y	N	N	N	N	N	N
39	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N
40	Y	Y	N	N	Y	Y	Y	N	N	N	N	N	N	N
41	Y	Y	N	N	Y	Y	Y	N	N	N	N	N	N	N
42	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N
43	N	N	N	N	Y	Y	Y	Y	N	N	N	N	N	N
44	Y	Y	N	N	Y	Y	N	N	N	N	N	N	N	N
45	N	N	N	N	N	N	N	N	N	N	N	N	N	N
46	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N
47	Y	N	N	N	Y	Y	N	N	N	N	N	N	N	N
48	Y	Y	N	N	Y	Y	Y	Y	N	N	N	N	N	N
49	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N	N
50	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
51	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
52	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
53	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
54	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
54a	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
55	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
56	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
57	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N
58	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N

Legend:
Y = Yes
N = No

Table 16 Connectivity with Adjacent Habitats

Habitat Impact Area	Little Connectivity to Adjacent Habitat	Limited Connectivity to Adjacent Habitat	Somewhat Important for Connectivity to Adjacent Habitat	Important for Connectivity to Adjacent Habitat	Very Important for Connectivity
1	N	Y	N	N	N
2	N	N	N	N	N
3	N	N	N	N	N
4	N	N	N	N	N
5	N	N	N	N	N
6	N	N	N	N	N
7	N	N	N	N	N
8	N	Y	N	N	N
9	N	Y	Y	N	N
10	N	Y	Y	N	N
11	N	Y	Y	N	N
12	N	N	N	N	N
13	N	Y	Y	N	N
14	N	Y	Y	N	N
15	N	Y	Y	N	N
16	N	Y	Y	N	N
17	N	N	N	N	N
18	N	N	N	N	N
19	N	Y	Y	N	N
20	N	N	N	N	N
21	N	N	N	N	N
22	N	Y	Y	N	N
23	N	Y	Y	N	N
24	N	Y	Y	N	N
25	N	Y	Y	N	N
26	N	N	N	N	N
27	N	N	N	N	N
28	N	N	N	N	N
29	N	N	N	N	N
30	N	N	N	N	N
31	N	N	N	N	N
32	N	N	N	N	N
33	N	N	N	N	N
34	N	N	N	N	N
35	N	N	N	N	N
36	N	N	N	N	N
37	N	N	N	N	N
38	N	N	N	N	N
39	N	N	N	N	N
40	N	N	N	N	N
41	N	N	N	N	N
42	N	N	N	N	N
43	N	N	N	N	N
44	N	N	N	N	N
45	Y	Y	N	N	N
46	N	N	N	N	N
47	N	N	N	N	N
48	N	N	N	N	N
49	N	N	N	N	N
50	N	N	N	N	N
51	N	N	N	N	N
52	N	N	N	N	N
53	N	N	Y	N	N
54	N	N	N	N	N
54a	N	N	N	N	N
55	N	N	N	N	N
56	N	N	N	N	N
57	N	N	N	N	N
58	Y	Y	N	N	N

Legend:
Y = Yes
N = No

Table 17 Habitat Degredation

Habitat Impact Area	Significant Chemical Contamination	Significant Dumping	Significant Erosion / Sedimentation	Significant Invasives	Highway / Road Disturb.	Only Resource Area In Vacinity	Other Human Disturbance
1	A	A	A	A	A	A	A
2	A	A	A	A	P	A	P
3	A	A	P	A	P	A	P
4	A	A	P	A	A	A	A
5	A	A	P	A	A	A	A
6	A	A	P	A	P	A	P
7	A	A	A	P	A	A	P
8	A	A	A	P	A	A	P
9	A	A	A	P	A	A	A
10	A	A	A	P	A	A	P
11	A	A	A	P	P	A	P
12	A	A	A	P	P	A	A
13	A	A	A	P	A	A	P
14	A	A	A	P	A	A	P
15	A	A	A	P	A	A	P
16	A	A	A	P	A	A	P
17	A	A	A	P	A	A	P
18	A	A	A	P	A	A	P
19	A	A	A	P	P	A	P
20	A	A	A	P	A	A	P
21	A	A	A	P	A	A	P
22	A	A	A	P	A	A	P
23	A	A	A	P	A	A	P
24	A	A	A	P	A	A	P
25	A	A	A	A	A	A	P
26	A	A	A	P	A	A	P
27	A	A	A	P	A	A	P
28	A	A	A	P	A	A	P
29	A	A	A	A	A	A	P
30	A	A	A	P	A	A	P
31	A	A	A	P	A	A	P
32	A	A	A	P	P	A	P
33	A	A	A	P	A	A	P
34	A	A	A	A	P	A	A
35	A	A	A	P	A	A	P
36	A	A	A	P	A	A	P
37	A	A	A	P	A	A	P
38	A	A	A	P	A	A	P
39	A	A	A	P	A	A	P
40	A	A	A	P	A	A	P
41	A	A	A	P	A	A	P
42	A	A	A	P	A	A	P
43	A	A	A	P	A	A	P
44	A	A	A	P	A	A	P
45	A	A	P	P	A	P	P
46	A	A	A	P	A	P	P
47	A	A	A	P	A	A	P
48	A	A	A	A	A	A	P
49	A	A	A	A	A	A	P
50	A	A	A	P	A	P	P
51	A	A	A	A	A	A	P
52	A	A	A	P	A	A	P
53	A	A	A	A	A	A	A
54	A	A	A	P	A	A	P
54a	A	A	A	P	A	A	P
55	A	A	A	A	A	A	A
56	A	A	A	A	A	A	A
57	A	A	A	P	A	A	P
58	A	A	A	P	P	A	P

Legend:
A = Absent
P = Present

Table 18 Comprehensive MVRP Wetland Resource Area Impacts

Wildlife Habitat Impact Area	Wetland Area #	MA Wetland Resource Area (s)	Town	Associated Stream (SA#)	BVW (sf)				RFA (sf)				100 Year Floodplain (BLSF)(sf)			
					Permanent (fill) sf	Temporary (timber mat access, timber mat work areas, timber mat pull/stringing areas, and staging areas) sf	Tree Clearing		Permanent (fill) sf	Temporary (timber mat access, timber mat work areas, timber mat pull/stringing areas and staging areas in wetland and/orupland work areas) sf	Tree Clearing		Permanent (fill) sf	Temporary (timber mat access, timber mat work areas, timber mat pull/stringing areas, and staging areas in wetland and /or upland work areas) sf	Tree Clearing	
							Timber mats placed within tree clearing Zone (sf)	Tree Clearing only (secondary impacts) sf			Timber mats placed within tree clearing Zone (sf)	Tree Clearing (secondary impacts) sf			Timber mats placed within tree clearing Zone (s)	Tree Clearing (secondary impacts) sf
1	WA29	BVW	Dracut	NA	-	2,424		-	-	-		-	-	-		-
2	WA29	BVW	Dracut	NA	810	-		-	-	-		-	-	-		-
3	WA28	BVW	Dracut	NA	-	1,291		-	-	-		-	-	-		-
4	WA28	BVW	Dracut	NA	-	478		-	-	-		-	-	-		-
5	WA26	BVW	Dracut	NA	-	374		-	-	-		-	-	-		-
6	WA26	BVW	Dracut	NA	-	1,242		-	-	-		-	-	-	1	-
7	WA24	BVW	Dracut	NA	-	499		-	-	-		-	-	-		-
8	WA23	BVW	Dracut	NA	-	1,103		-	-	-		-	-	-		-
9	WA23	BVW	Dracut	NA	-	4,098	4,098	10,276	-	-		-	-	-		-
10	WA23	BVW	Dracut	NA	15	22,960		-	-	-		-	-	-		-
11	WA20	BVW	Dracut	NA	-	2,211		-	-	-		-	-	-		-
12	WA18A and WA18B	BVW	Dracut	NA	-	-		-	-	-		-	-	-		-
13	WA19	BVW	Dracut	NA	-	620		-	-	-		-	-	-		-
14	WA18	BWV	Dracut	NA	-	991		-	-	-		-	-	-		-
15	WA17A	BVW	Dracut	NA	-	5,049		-	-	-		-	-	-		-
16	WA17A	BVW	Dracut	NA	-	1,765		-	-	-		-	-	-		-
17	WA17A	BVW	Dracut	SA-9	-	-		1,716	-	-		-	-	-		-
18	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	-		137	2,189	-	-		-
19	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	25	6,847		-	-	-		-
20	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	15	4,809		-	-	-		-
21	WA17	BVW and RFA	Dracut	SA-8	-	2,900		-	-	2,900		-	-	-		-
22	WA17	BVW, RFA	Dracut	SA-8	-	587		-	-	696		-	-	-		-
23	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	-	2,496		-	-	-		-
24	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	50	27,671		-	-	-		-
25	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	-	-		3,448	-	-		-
26	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	-	1,127		-	-	-		-
27	Trout Brook RFA	RFA	Dracut	SA-8	-	-		-	25	7,153		-	-	-		-
28	WA17	BVW	Dracut	NA	150	15,397		-	-	-		-	-	-		-
29	WA16	BVW	Dracut	NA	-	461		-	-	-		-	-	-		-
30	WA16	BVW	Dracut	NA	30	9,840		-	-	-		-	-	-		-
31	WA16	BVW	Dracut	NA	-	2,670		-	-	-		-	-	-		-
32	WA15A	BLSF, RFA	Dracut	SA-7	-	-		-	-	570		-	-	365		-
33	Unnamed Perennial Stream RFA	RFA	Dracut	NA	-	-		-	55	13,653		-	-	-		-
34	WA13	BVW	Dracut	SA-5	55	34,248		-	-	-		-	-	-		-
35	WA8	BVW	Andover	NA	-	305		-	-	-		-	-	-		-
36	WA7B	BVW	Tewksbury	NA	30	14,916		-	-	-		-	-	-		-
37	WA7B	BVW	Tewksbury	SA-3	85	57,935		-	-	-		-	-	-		-
38	WA78	BVW	Tewksbury	SA-3	59	33,280		-	-	-		-	-	-		-
39	WA7C	BVW	Tewksbury	NA	100	4,915		-	-	-		-	-	-		-
40	WA7	BVW	Tewksbury	SA-3	-	6,794		-	-	-		-	-	-		-
41	WA7	BVW	Tewksbury	SA-2 & SA-3	109	22,116		-	-	-		-	-	-		-
42	WA7	BVW	Tewksbury	SA-2	9	10,075	10,074	8,803	-	-		-	-	-		-
43	WA7	BVW	Tewksbury	NA	50	25,316		-	-	-		-	-	-		-
44	WA4	BVW	Tewksbury	NA	120	58,503			-	-		-	-	-		-
45	WA1C	BVW	Tewksbury	SA-1	-	1,254		-	-	-		-	-	-		-
46	WA1A	BVW	Tewksbury	SA-1	50	26,703		-	-	-		-	-	-		-
47	WA1A	BVW	Tewksbury	NA	-	1,934		-	-	-		-	-	-		-
48	WA1A	BVW	Tewksbury	NA	-	1,461	1,461	561	-	-		-	-	-		-
49	WA1A	BVW	Tewksbury	NA	-	1,316		-	-	-		-	-	-		-
50	WA1A	BVW	Tewksbury	NA	-	3,716		-	-	-		-	-	-		-
51	WA1A	BVW	Tewksbury	NA	-	687	687	-	-	-		-	-	-		-
52	WA1A	BVW	Tewksbury	NA	-	3,804		-	-	-		-	-	-		-
53	Flood Zone Assoc with WA1	BLSF	Tewksbury	NA	-	-		-	-	-		-	-		139	1,962
54	WA1	BVW, BLSF	Tewksbury	NA	55	25,442		-	-	-		-	30	7,328		-
54a	WA1	BVW, BLSF	Tewksbury	NA	-	4,364		-	-	-		-	-	4,364		-
55	WA1	BVW, BLSF	Tewksbury	NA	18	29,028	29,028	33,582	-	-		-	18		29,218	33,392
56	WA1	BVW, BLSF	Tewksbury	NA	259	93,819		-	-	-		-	59	31,343		-
57	WA1	BVW, BLSF	Tewksbury	NA	9	29,940	-	-	-	-		-	57	23,153		-
58	WA1	BVW	Tewksbury	NA	-	6,212		-	-	-		-	-	-		-
Totals SF	-	-	-	-	2,013	575,044	45,349	54,937	170	67,922	137	5,637	164	66,553	29,357	35,353
Totals Acres	-	-	-	-	0.05	13.20	1.04	1.26	0.004	1.56	0.003	0.13	0.004	1.53	0.67	0.81
Total Tree Clearing (sf)	-	-	-	-	-	-	100,287		-	-	5773.93		-	-	64710.19	
Total Tree Clearing (ac)	-	-	-	-	-	-	2.30		-	-	0.13		-	-	1.49	

Appendix D:
Data Forms

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 1 **Date** 09/17/15 **Field Staff** JV HR

Town Dracut, MA **Associated Waterway or Waterbody** ______

Photos 1

Weather Conditions Sunny, 75F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Open emergent marsh on maintained ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Carex stricta*		
H	*Lactua sp*		
H	*Solidago rugosa*		
H	*Symphyotrichum lateriflorum*		
H	*Typha latifolia*		
H	*Scirpus cyperinus*		

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~6"

Vegetation Community Name ________

Vegetation Description ________

Physical Description ________

Comments:

-Seasonally flooded/saturated

-Percent cover:
0% trees
5% shrubs
0% moss/lichen
100% herbaceous

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 2 **Date** 09/17/15 **Field Staff** JV HR

Town Dracut, MA **Associated Waterway or Waterbody** ____

Photos Photo 2

Weather Conditions Sunny, 75F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) ____ **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description:

Existing access road, between two emerging wetlands

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Impatiens capensis*		
H	*Lythrum salicaria*		
H	*Solidago rugosa*		
H	*Carex stricta*		
H	*Onoclea sensibilis*		
SH	*Rhamnus frangula*		
VI	*Vitis lambrusca*		

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~6"

Vegetation Community Name ________

Vegetation Description Emergent Marsh

Physical Description Wetland fringing sides of access road

Comments:

Potential for water to flow from wetlands across ROW into adjacent wetland over the access road

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 3 **Date** 09/17/15 **Field Staff** JV HR

Town Dracut **Associated Waterway or Waterbody** ______

Photos 3

Weather Conditions Sunny, 75F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Maintained utility ROW adjacent to access road

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
SH	*Rhamnus frangula*		
H	*Lythrum salicaria*		
H	*Eutrochium*		
H	*Euthamia graminifolia*		

Soils

Soil Survey Unit Montauk FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~18"

Vegetation Community Name ________________________________

Vegetation Description Maintained shrubland within utility ROW

Physical Description Adjacent to exisiting access road

Comments:

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 4 **Date** 09/17/15 **Field Staff** JV HR

Town Dracut **Associated Waterway or Waterbody** ______

Photos Photo 4

Weather Conditions Sunny, 75F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Maintained shrubland within ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
SH	*Rhamnus frangula*		
H	*Lactua sp*		
H	*Euthamia graminifolia*		
H	*Impatiens capensis*		
H	*Eutrochium*		
VI	*Vitus sp*		

Soils

Soil Survey Unit Montauk FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~18"

Vegetation Community Name________________________________

Vegetation Description maintained shrubland

Physical Description mainatined shrubland within ROW

Comments:

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

12:13am

Wetland Impact Area 5 **Date** 09/17/15 **Field Staff** JV HR

Town Dracut **Associated Waterway or Waterbody** ____

Photos Photo 5

Weather Conditions Sunny, 75F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) ____ **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description:

Shrub thicket within maintained ROW under power lines

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
SH	*Rhamnus frangula*		
H	*Solidago rugosa*		
H	*Onoclea sensibilis*		
SH	*Rubus ideaus*		

Soils

Soil Survey Unit Montauk FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~18"

Vegetation Community Name ________

Vegetation Description Mostly buckthorn

Physical Description maintained shrubland on ROW

Comments:

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

12:35am

Wetland Impact Area 6 **Date** 9/17/15 **Field Staff** JV HR

Town Dracut, MA **Associated Waterway or Waterbody** ______

Photos Photo 6

Weather Conditions Sunny, 75F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Maintained shrubland within utility ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
SH	*Rhamnus frangula*		
H	*Solidago rugosa*		
SH	*Viburnum dentatum*		
VI	*Vitus sp*		
H	*Euthamia graminifolia*		
H	*Onoclea sensibilis*		
H	*Lythrum salicaria*		

Soils

Soil Survey Unit Montauk FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~18"

Vegetation Community Name ________________

Vegetation Description ________________

Physical Description ________________

Comments:

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 7 **Date** 10/6/15 **Field Staff** HR and JV

Time 12:41 **Town** Dracut

Associated Waterway or Waterbody ______

Photos 11, view to the East

Weather Conditions Sunny 60F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Soils

Soil Survey Unit Scituate FSL **Drainage Class** Moderately well drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~18"

Vegetation Community Name: Shruby Wetland

Vegetation Description: Maintained shrubs on ROW, dominated by Buckthorn

Physical Description: Level adjacent to access road

Comments:

Wetland Impact Area 7 **Date** 10/6/15 **Field Staff** HR and JV

Time 12:41 **Town** Dracut

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	Rhamnus frangula	H	Euthamia gramnfolia
S	Viburnum cassinoides		
S	Corylus americana		
H	Solidago rugosa		
H	Iris versicolor		
H	Symphyotrichum puniceum		
H	Lythrum salicaria		
H	Ranunculus hispidus		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 8 **Date** 9/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ______

Photos #1 view west

Weather Conditions Sunny, 65F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Shrubby, maintained portion of ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S and H	*Rhamnus frangula*		
H	*Onoclea sensibilis*		
H	*Rubus argutus*		
H	*Rubus hispidus*		
H	*Impatiens capensis*		

Soils

Soil Survey Unit Scituate FSL **Drainage Class** Moderately well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~18"

Vegetation Community Name ________

Vegetation Description Shrubands with invasives as dominant species

Physical Description Maintained ROW, relatively level

Comments:

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 9 **Date** 9/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ______

Photos #2 Representative

Weather Conditions 65F and sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Forested unmiantained portion of ROW, narrow and long

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
T	*Acer rubrum*	S and H	*Rhamnus frangula*
T	*Fraxinus americana*	S	*Osmunda regalis*
T	*Quercus bicolor*	S	*Onoclea sensibilis*
T	*Quercus alba*	H	*Maianthemum canadense*
T	*Quercus rubra*	H	Mixed Sedges
T	*Pinus strobus*		
S	*Ilex verticillata*		
S	*Lindera benzoin*		

Soils

Soil Survey Unit Scituate FSL **Drainage Class** Moderately well drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~18"

Vegetation Community Name ______

Vegetation Description Forested along edges of ROW

Physical Description Indicators of standing surface water during early or part of growing season

Comments:

Possibly historic pasture lands

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 10 **Date** 9/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ____

Photos #3

Weather Conditions 65F and sunny

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) ____ **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description:

Maintained portion of ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula*	H	*Solidago rugosa*
H	*Eutrochium*		
H	*Thelypteris palustris*		
H	*Lythrum salicaria*		
H	*Spiraea latifolia*		
H	*Spiraea tomentosa*		
H	*Carex crinata*		
H	Mixed Grasses		

Soils

Soil Survey Unit Scituate FSL **Drainage Class** Moderately well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** ~18"

Vegetation Community Name ________

Vegetation Description Maintained shrubs on ROW

Physical Description ________

Comments:

Mostly shurbland on ROW, some patches of emeregent vegentation. Dominated by buckthorn. Signs of recent mowing. Probably water at or near surface during the spring.

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 11 **Date** 09/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ____________________

Photos #4 view south

Weather Conditions 65F, sunny

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ________

BVW area (sf) ________ **Upland RFA area (sf)** ________ **Upland BLSF area (sf)** ________

Site Description:

Maintined Row adjacent to Road

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula*		
S	*Viburnum dentatum*		
E	*Solidago rugosa*		
H	*Rubus argutus*		
E	*Onoclea Sensibilis*		
M	Sphagnum		

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** >80"

Vegetation Community Name ________

Vegetation Description Maintained ROW, little diversity

Physical Description Flat adjacent to road

Comments:

Little diversity, all shrubs uniform height, mowed regularly

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 13 **Date** 9/23/15 **Field Staff** HR and JV

Time 1:00 **Town** Dracut

Associated Waterway or Waterbody ________

Photos #5, view to the North

Weather Conditions 70F, sunny

Total Area Affected (SF) ________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Maintained ROW

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ______

Vegetation Community Name:

Vegetation Description: Maintained ROW, uniform height

Physical Description: Adjacent to access road

Comments: likely small isolated wetland, superficially dry

Wetland Impact Area 13 **Date** 9/23/15 **Field Staff** HR and JV

Time 1:00 **Town** Dracut

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	Rhmanus frangula		
H	Euthamia graminifolia		
H	Solidago rusgosa		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 14 **Date** 9/23/15 **Field Staff** HR and JV

Time________ **Town** Dracut

Associated Waterway or Waterbody ________________________

Photos #6, view to the East

Weather Conditions 70F sunny

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** __________

BVW area (sf) _________ **Upland RFA area (sf)** _________ **Upland BLSF area (sf)** _________

Site Description: Maintained ROW

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** _______ **Depth to Water Table** ____________

Vegetation Community Name:

Vegetation Description: Shrubby with small portions of emergent vegetation

Physical Description: Adjacent to access road

Comments: Sloped slightly towards road, maintained shrubs of uniform height mostly

Wetland Impact Area 14 **Date** 9/23/15 **Field Staff** HR and JV

Time________ **Town** Dracut

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	Rhamnus frangula		
S	Alnus incana		
H	Solidago rugosa		
H	Euthamnia graminifolia		
S	Rosa multiflora		
H	Lythrum salicaria		
H	Onoclea sensibilis		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 15 **Date** 09/23/15 **Field Staff** JV and HR

Town Dracut **Associated Waterway or Waterbody** ______

Photos #7, southeast

Weather Conditions 70F, sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Maintained ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Alnus incana*	H	*Thelypteris palustris*
S	*Rhamnus frangula*		
S	*Rosa multiflora*		
H	*Lythrum salicaria*		
H	*Euthamia graminifolia*		
H	*Solidago rugosa*		
H	*Typha latifolia*		
H	*Symphyotrichum puniceum*		

Soils

Soil Survey Unit Swansea muck **Drainage Class** very poorly drained

Texture Upper Part Organic **Depth** ________ **Depth to Water Table** ~3"

Vegetation Community Name ________

Vegetation Description Primarily herbaceous with mix of shrubs

Physical Description Area on maintained ROW

Comments:

Flat, indication of shallow ponding early in the season in spots

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

2:00pm

Wetland Impact Area 16 **Date** 9/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ____________

Photos #8, view south

Weather Conditions 70F, sunny

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

maintained ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula*		
S	*Rosa multiflora*		
H	*Onoclea sensibilis*		
H	*Solidago rugosa*		
H	*Parthenocissus quinquefolia*		

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ________ **Depth to Water Table** ~6"

Vegetation Community Name ____________________

Vegetation Description dense tall shrubs, dominated by buckthorn

Physical Description ____________________

Comments:

Slightly sloped to the southeast, inpenetrable thicket of shrubs

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 17 **Date** 10/6/15 **Field Staff** HR and JV

Time 9:42 am **Town** Dracut, MA

Associated Waterway or Waterbody ____________

Photos 1-3, showing stream west and southwest and PFO South

Weather Conditions Sunny, 50F

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Forested Wetland with Stream within unmaintained portion of ROW

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~3"

Vegetation Community Name:

Forested Wetland, check NHESP classification

Vegetation Description:

Forested wetland dominated by Red Maple
Relatively young trees

Physical Description:

Unmaintained portion of ROW, west side of ROW

Comments:

Stream curretly dry, will check status as intermittent. Stream banks 6" to 12", slightly undercut with roots and woody debris. Stream substrate muddy and soft.

Wetland Impact Area _17_ **Date** 10/6/15 **Field Staff** HR and JV

Time 9:42am **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
T	*Acer rubrum*		
S	*Acer rubrum*		
S	*Rhamnus frangula*		
H	*Onoclea sensibilis*		
H	*Rhamnus frangula*		
H	*Fraxinus americana*		
H	*Rosa multiflora*		
L	*Celastrus orbiculatus*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 18 **Date** 10/6/15 **Field Staff** HR and JV

Time 10:15 **Town** Dracut, MA

Associated Waterway or Waterbody ____________________

Photos 4, view to the south

Weather Conditions 50F, sunny

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ________

BVW area (sf) ________ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ________

Site Description: ROW unmaintained forested RFA, thin sliver of land will be subject to tree removal

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** >80"

Vegetation Community Name:

Upland Forested RFA

Vegetation Description:

Relatively young trees, abundant invasives present

Physical Description:

Relatively flat located between two streams, both likley to be intermittent

Comments:

Scattered small deadwood almost in a pile

Wetland Impact Area 18 **Date** 10/6/15 **Field Staff** HR and JV

Time 10:19 **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
T	*Acer rubrum*	L	*Celastrus orbiculatus*
T	*Prunus serotina*	L	*Vitis sp*
T	*Malus sp.*		
S	*Rhamnus frangula*		
H	*Onoclea sensibilis*		
H	*Fraxinus americana*		
H	*Rosa multifora*		
H	*Rhamnus frangula*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

2:20pm

Wetland Impact Area 19 **Date** 09/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ______

Photos #9 view west

Weather Conditions 75F, sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ______

Site Description:

Maintained ROW, upland but within RFA

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula*	H	*Euthamia graminifolia*
S	*Corylus americana*	S	*Rubus sp*
H	*Solidago rugosa*		
H	*Lactua sp*		
S	*Elaeagnus umbellata*		
H	*Schizachyrium scoparium*		
L	*Celastrus orbiculatus*		
L	*Vitis labrusca*		

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** >80"

Vegetation Community Name ________

Vegetation Description Low shrubs, <1m

Physical Description Upland RFA, sloped to west and cross by access road

Comments:

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 20 **Date** 10/6/15 **Field Staff** HR and JV

Time 10:40am **Town** Dracut, MA

Associated Waterway or Waterbody ________________

Photos 5, view to the south

Weather Conditions 50F, sunny

Total Area Affected (SF) ________________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** __________

BVW area (sf) _________ **Upland RFA area (sf)** x **Upland BLSF area (sf)** _________

Site Description: Maintained portion of ROW, Mixed shrubs and Herbs

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** >80"

Vegetation Community Name:

Maintained ROW

Vegetation Description:

Mixed shrubs and herbs, many invasives

Physical Description:

Relatively flat, open under powerline

Comments:

Lack of diversity, vegetation dominated by invasives, ID'd as RFA but streams is dry

Wetland Impact Area 20 **Date** 10/6/15 **Field Staff** HR and JV

Time 10:40am **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Rhamnus frangula*		
S	*Rhamnus frangula*		
S	*Elaeagnus umbellata*		
H	*Elaeagnus umbellata*		
H	*Solidago rugosa*		
L	*Celastrus orbiculatus*		
S	*Malus sp.*		
S	*Rosa multiflora*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 21 **Date** 10/6/15 **Field Staff** HR and JV

Time 10:53 **Town** Dracut, MA

Associated Waterway or Waterbody ________

Photos #6, view to the east and #7, view to the south

Weather Conditions 55F, sunny

Total Area Affected (SF) ________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Maintained portion of ROW

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~3"

Vegetation Community Name:

Shrubby wetland bordering stream

Vegetation Description:

Dense thicket bordering stream, invasives dominant

Physical Description:

Even terrain, gradually slopes to the west

Comments:

Stream dry and possibly not perennial. Stream is broad and somehwat diffuse -- lots of small woody debris scattered in stream. Many branches hanging over stream.

Wetland Impact Area 21 **Date** 10/6/15 **Field Staff** HR and JV

Time 10:53 am **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
L	*Celastrus orbiculatus*		
S	*Rosa multiflora*		
S	*Rhamnus frangula*		
H	*Rhamnus frangula*		
H	*Solidago rugosa*		
S	*Alnus incana*		
H	*Lythrum salicaria*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 22 **Date** 09/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ____

Photos #12, view northeast

Weather Conditions 70F, sunny

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) * ____ **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

*stream across road

Site Description:

Access road on ROW w/ wetland on both sides, in addition to stream crossing

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rosa multiflora*	H	*Solidago rugosa*
L	*Clematis*	H	*Typha latifolia*
L	*Celastrus orbiculatus*	H	*Thelypteris palustris*
S	*Rhamnus frangula*	H	*Lythrum salicaria*
H	*Dichanthelium clandestinum*		
S	*Viburnum recognitum*		
H	*Onoclea Sensibilis*		
H	*Bidens sp*		

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ________ **Depth to Water Table** ~3"

Vegetation Community Name________________________________

Vegetation Description Shrubby area bordering on stream, crossed by access road

Physical Description________________________________

Comments:

Stream prsenting dry, perennial? RFA?

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

2:40pm

Wetland Impact Area 23 **Date** 09/23/15 **Field Staff** HR and JV

Town Dracut **Associated Waterway or Waterbody** ______

Photos #11 view west

Weather Conditions 75F, sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ______

Site Description:

Maintained ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Comptonia*		
H	LB STRM?		
S	*Viburnum recognitum*		
H	*Verbascum thapsus*		
S	*Rhamnus frangula*		
H	*Juniperus communis*		
H	*Pteridium aquilinum*		
H	*Liana sp.*		

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** >80"

Vegetation Community Name________________

Vegetation Description Upland mostly herbaceous

Physical Description Dry upland adjcent to access road

Comments:

includes structures #64

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

2:50pm

Wetland Impact Area 24 **Date** 09/23/15 **Field Staff** HR/JV

Town Dracut **Associated Waterway or Waterbody** ______

Photos #11, view northwest

Weather Conditions 75F, sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ______

Site Description:

Shrubby maintained ROW

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Juniperus communis*	S	*Corylus americana*
S	*Rubus argutus*		
S and H	*Rhamnus frangula*		
H	*Viburnum recognitum*		
H	*Rubus sp*		
H	*Pteridium aquilinum*		
H	*Comptonia*		
S	*Vaccinium corymbosum*		

Soils

Soil Survey Unit Canton FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ________ **Depth to Water Table** >80"

Vegetation Community Name ____________________

Vegetation Description Dense low shrubs within upland

Physical Description On maintained ROW, sloped to West

Comments:

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

3:30pm

Wetland Impact Area 25 **Date** 09/23/15 **Field Staff** HR and JV

Town Dracut MA **Associated Waterway or Waterbody** ____________

Photos #13, view south

Weather Conditions 75F, Sunny

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ______

Site Description:

Upland forest within RFA

Plant List (species that comprise 10% or more of the vegetative cover in each strata ("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
T	*Pinus strobus*		
T	*Pinus resinosa*		
S and H	*Vaccinium angustifolium*		
S	*Rhamnus frangula*		

Soils

Soil Survey Unit Charlton-Hollis Rock **Drainage Class** Well drained

Texture Upper Part ______ **Depth** ______ **Depth to Water Table** >80"

Vegetation Community Name ______

Vegetation Description Open forested area, almost no herb layer

Physical Description Open dry forest, few shrubs and virtually no herbs, dense mat of needles

Comments:

Mostly large white pines

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 26 **Date** 10/6/15 **Field Staff** HR and JV

Time 11:17am **Town** Dracut, MA

Associated Waterway or Waterbody ____________

Photos #8, view to the east

Weather Conditions 60F, Sunny

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ______

Site Description:
Maintained ROW close to access road

Soils

Soil Survey Unit Charlton-Hollis Rock **Drainage Class** Well drained

Texture Upper Part ______ **Depth** ______ **Depth to Water Table** >80"

Vegetation Community Name:

Maintained ROW

Vegetation Description:

Patches of low shrubs and sparse ground cover

Physical Description:

Sloped slightly to the east and west

Comments:

Mostly dominated by invasives

Wetland Impact Area 26 **Date** 10/6/15 **Field Staff** HR and JV

Time 11:17am **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	**Plant Species**	**Strata**	**Plant Species**
S	*Rhamnus frangula*		
H	*Solidago rugosa*		
H	*Rhamnus frangula*		
H	*Rubus hispidus*		
M	*Polytrichum sp.*		
H	*Schizachyrium scoparium*		
H	*Vaccinium angustifolium*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 27 **Date** 10/6/15 **Field Staff** HR and JV

Time 11:18am **Town** Dracut, MA

Associated Waterway or Waterbody ____

Photos #9, view to the west

Weather Conditions 60F, sunny

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) ____ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ____

Site Description:

Maintained portion of ROW

Soils

Soil Survey Unit Charlton-Hollis Rock **Drainage Class** Well Drained

Texture Upper Part ____ **Depth** ____ **Depth to Water Table** >80"

Vegetation Community Name:

Maintained portion of ROW. Open, patchy, low shrubs and herbs.

Vegetation Description:

Maintained, dominated by invasive species

Physical Description:

Gradually slopes to the northeast

Comments:

Wetland Impact Area 27 **Date** 10/6/15 **Field Staff** HR and JV

Time 11:28am **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula*	M	*Polytrichum sp.*
H	*Rhamnus frangula*	H	*Juniperus communis*
H	*Corylus americana*	S	*Pinus strobus*
H	*Schizachyrium scoparium*	H	*Rubus hispidus*
H	*Comptonia peregrina*	H	*Solidago rugosa*
H	*Pteridium aquilinum*		
S	*Quercus berberidifolia*		
H	*Vaccinium angustifolium*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 28 **Date** 10/6/15 **Field Staff** HR and JV

Time 11:50am **Town** Dracut, MA

Associated Waterway or Waterbody ______

Photos #10, view to the northwest

Weather Conditions 60F, sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Cattail marsh, maintained portion of ROW

Soils

Soil Survey Unit Swansea muck **Drainage Class** very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~3"

Vegetation Community Name:

PEM, persistent

Vegetation Description:

Cattails, some phraag. Partial shrub fringe (buckthorn).

Physical Description:

Open marsh on ROW

Comments:

North of impact area, abundant tall snags.

Wetland Impact Area 28 **Date** 10/6/15 **Field Staff** HR and JV

Time 11:50 **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia*	H	*Rubus argutus*
H	*Phragmites australis*	S	*Ilex verticillata*
H	*Lythrum salicaria*	S	*Viburnum dentatum*
H	*Solidago rugosa*		
H	*Scirpus cyperinus*		
H	*Symphyotrichum puniceum*		
S	*Rhamnus frangula*		
H	*Rubus hispidus*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 29 **Date** 10/8/15 **Field Staff** HR and JV

Time 10:43am **Town** Dracut

Associated Waterway or Waterbody ______

Photos #3, view to the west

Weather Conditions 55F, sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: On ROW, maintained hayfield

Soils

Soil Survey Unit Wareham LFS **Drainage Class** Poorly drained

Texture Upper Part LFS **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: PEM non persistent

Vegetation Description: Low grasses and herbs

Physical Description: Wide drainage way, connecting two wetlands

Comments:

Wetland Impact Area 29 **Date** 10/8/15 **Field Staff** HR and JV

Time 10:43am **Town** Dracut

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Trifolium pratense*	H	*Carex stricta*
H	*Goodyera pubescens*	H	*Phalaris arundinacea*
H	*Echinochloa sp.*	H	*Onoclea sensibilis*
H	*Hieracium caespitosum*		
H	Unidentifiable mixed grasses		
H	*Phleum pratense*		
H	*Eutrochium sp.*		
H	*Lythrum salicaria*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 30 **Date** 10/8/15 **Field Staff** HR and JV

Time 11:00 **Town** Dracut

Associated Waterway or Waterbody ______

Photos #4, view to the west

Weather Conditions Sunny, 55F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: On maintained ROW, flat cattail marsh

Soils

Soil Survey Unit Wareham LFS **Drainage Class** Poorly drained

Texture Upper Part LFS **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: PEM Persistent

Vegetation Description: Primarily a cattail marsh with some shrubs

Physical Description:

Gradually level with saturated soils. Adjacent to hayfield.

Comments:

Wetland Impact Area 30 **Date** 10/8/15 **Field Staff** HR and JV

Time 11:00 **Town** Dracut

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia*	H	*Carex stricta*
H	*Scirpus cyperinus*	S	*Spiraea latifolia*
H	*Lythrum salicaria*	S	*Viburnum recognitum*
H	*Acer rubrum*	S	*Ilex verticillata*
H	*Phalaris arundinacea*	S	*Rhamnus frangula*
H	*Juncus effusus*	S	*Salix sp.*
H	*Symphyotrichum puniceum*	S	*Lyonia ligustrina*
H	*Thelypteris palustris*	M	*Sphagnum sp.*

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 31 **Date** 10/8/15 **Field Staff** HR and JV

Time 10:11am **Town** Dracut

Associated Waterway or Waterbody ____

Photos #2, to the east

Weather Conditions sunny, 55F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) x **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description: Cattail Marsh on Maintained ROW

Soils

Soil Survey Unit Wareham LFS **Drainage Class** Poorly drained

Texture Upper Part LFS **Depth** ____ **Depth to Water Table** ~6"

Vegetation Community Name: PEM Persistent

Vegetation Description: Primarily Cattail Marsh

Physical Description: Flat, low area along edge of maintained ROW

Comments: Part of Farmer Dave's land, Phragmites begining to invade area

Wetland Impact Area 31 **Date** 10/8/15 **Field Staff** HR/JV

Time 10:11am **Town** Dracut

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia*	H	*Juncus effusus*
H	*Scirpus cyperinus*	S	*Rhamnus frangula*
H	*Phragmites*		
S	*Salis sp.*		
S	*Lyonia ligustrina*		
H	*Solidago rugosa*		
H	*Spirea tomentosa*		
H	*Acer rubrum*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 32 **Date** 10/6/15 **Field Staff** HR and JV

Time 2:00pm **Town** Dracut, MA

Associated Waterway or Waterbody ____________

Photos #13, view to the North

Weather Conditions 60F, sunny

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description:

Wetland adjacent to ROW

Soils

Soil Survey Unit Freetown muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~3"

Vegetation Community Name:

PSS and some PEM

Vegetation Description:

Shrubs along edge of access road, and stream (dry). Some emergent plants.

Physical Description:

Access road crossing over stream (RIP/RAP 3"-6")

Comments:

Stream dry, noted dry in early summer

Wetland Impact Area 32 **Date** 10/6/15 **Field Staff** HR/JV

Time 2:00 **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula*		
S	*Alnus incana*		
H	*Carrex sp.*		
H	*Phalaris arundinacea*		
H	*Lythrum salicaria*		
H	*Solidago rugosa*		
H	*Carrex lurida*		
H	*Bidens sp.*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 33 **Date** 10/6/15 **Field Staff** HR and JV

Time 1:45pm **Town** Dracut, MA

Associated Waterway or Waterbody ____

Photos #12, view to the west

Weather Conditions ____

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) ____ **Upland RFA area (sf)** x **Upland BLSF area (sf)** ____

Site Description: Dry sandy flat area adjacent to wetland and stream

Soils

Soil Survey Unit Hinckley loamy sand **Drainage Class** Excessively drained

Texture Upper Part sand **Depth** ____ **Depth to Water Table** ~80"

Vegetation Community Name:

Maintained ROW

Vegetation Description:

Dominated by buckthorn and little bluestem

Physical Description:

Flat, maintained ROW, patches of open areas with moss

Comments:

Evidence Dracut Maintenance activity, not far from vernal pool to the south, noticed signs of turtle nesting

Wetland Impact Area 33 **Date** 10/6/15 **Field Staff** HR and JV

Time 1:45pm **Town** Dracut, MA

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Rhamnus frangula*		
S	*Rhamnus frangula*		
H	*Schizachyrium scoparium*		
H	*Rubus hispidus*		
M	*Polytrichum*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 34 **Date** 10/6/15 **Field Staff** HR and JV

Time 3:00pm **Town** Dracut

Associated Waterway or Waterbody unnamed intermittent and perennial streams?

Photos photos #14-#19 in route from north to south of area

Weather Conditions 65F, sunny

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Large mixed shrubland and emeregent marsh in low laying area

Soils

Soil Survey Unit Freetown muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** 3"

Vegetation Community Name: Shrub scrub and Emergent marsh, mixed

Vegetation Description: mix of both emeregent in shrub wetlands areas

Physical Description: Large marsh on ROW not maintained because of saturated conditions year round

Comments: Streams could not be located within area, nor were stream beds found

Wetland Impact Area 34 **Date** 10/6/15 **Field Staff** HR and JV

Time 3:00pm **Town** Dracut

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia**	S	*Rhamnus frangula**
H	*Phragmites**	S	*Toxicodendron vernix*
H	*Solidago rugosa*	S	*Ilex verticillata*
H	*Lythrum salicaria*	S	*Cornus amomum*
H	*Scirpus cyperinus*	S	*Viburnum recognitum*
H	*Onoclea sensibilis*	S	*Vaccinium corymbosum*
H	*Thelypteris palustris*	S	*Chamaedaphne calyculata*
H	*Calamagrostis canadensis*	S	*Acer rubrum*
H	*Symphyotrichum puniceum*	S	*Salix sp.*
H	*Eutrochium*	S	*Rosa multifora*
H	*Symplocarpus foetidus*	S	*Alnus incana*
H	*Osmundastrum cinnamomeum*		
M	*Sphagnum sp.*		
H	*Osmunda regalis*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 35 **Date** 10/8/15 **Field Staff** HR and JV

Time 9:11am **Town** Andover

Associated Waterway or Waterbody ______

Photos #1, view to the north

Weather Conditions ______

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Accessway on Maintained ROW

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~8"

Vegetation Community Name: PEM, non persistent

Vegetation Description: Primarily herbaceous

Physical Description: Low area on access road

Comments: Evidence of vehicle crossings, RVTS.

Wetland Impact Area 35 **Date** 10/8/15 **Field Staff** HR and JV

Time 9:11am **Town** Andover

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Solidago rugosa*	S	*Lyonia ligustrina*
H	*Eupatorium perfoliatum*	S	*Rhamnus frangula*
H	*Lythrum salicaria*	S	*Rosa multiflora*
H	*Juncus effusus*	S	*Salix sp.*
H	*Euthamia graminifolia*	L	*Celastrus orbiculatus*
H	*Bindens sp.*	S	*Lonicera japonica*

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 36 **Date** 10/8/15 **Field Staff** HR and JV

Time 12:12pm **Town** Tewksbury

Associated Waterway or Waterbody ______

Photos #5, view to the south

Weather Conditions Sunny, 60F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Wetland within maintained ROW

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: Shrub scrub, deciduous wetland

Vegetation Description: Dominated by shrubs, namely buckthorn within maintained ROW

Physical Description: Shrubs lands with upland incursions

Comments:

Wetland Impact Area 36 **Date** 10/8/15 **Field Staff** HR and JV

Time 12:12pm **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula**	L	*Vitis sp*
S	*Ilex verticillata*	S	*Spiraea tomentosa*
S	*Viburnum recognitum*	H	*Symphyotrichum puniceum*
H	*Solidago rugosa*	H	*Rubus hispidus*
H	*Calamagrostis sp.*	S	*Elaeagnus umbellata*
H	*Euthamia graminifolia*	H	*Osmunda regalis*
H	*Lythrum salicaria*	L	*Parthenocissus quinquefolia*
S	*Lyonia ligustrina*	S	*Rosa multiflora*
S	*Spiraea latifolia*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 37 **Date** 10/8/15 **Field Staff** HR and JV

Time 12:30 **Town** Tewksbury

Associated Waterway or Waterbody ____

Photos #6 view to south, #7 view to west, #8 view south of stream

Weather Conditions sunny, 60F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) x **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description: Maintained ROW

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ____ **Depth to Water Table** ~6"

Vegetation Community Name: Mix of shrub scrub and non persistent emergent marsh

Vegetation Description: Primarily shrub scrub with emergent components

Physical Description: Hummocks with upland inclusions

Comments: Flooding in area likley to be around 6" in the spring to early summer. Stream sinuous banks up to 10" UERT. shagnum moss covers stream bed in places. Hummocks of Tussocks sedge. Mucky substrate, dry.

Wetland Impact Area 37 **Date** 10/8/15 **Field Staff** HR and JV

Time 12:30 **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species
S	*Rhamnus frangula*
H	*Carex crinita*
H	*Typha latifolia*
H	*Scirpus cyperinus*
H	*Eutrochium sp*
H	*Onoclea sensibilis*
H	*Boehmeria cylindrica*
H	*Lythrum salicaria*

Strata	Plant Species
H	*Symphyotrichum puniceum*
H	*Solidago rugosa*
H	*Bidens sp.*
H	*Thelypteris palustris*
M	*Sphagnum sp*
L	*Parthenocissus quinquefolia*
H	*Osmunda regalis*
H	*Carex stricta*
H	*Rubus hispidus*
S	Ilex verticillata

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 38 **Date** 10/8/15 **Field Staff** HR and JV

Time 1:07pm **Town** Tewksbury

Associated Waterway or Waterbody ______

Photos #9 view to the north, #10 view to the west, #12 view of stream

Weather Conditions sunny, 60F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Maintained ROW

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: Shrub scrub and emergent marsh, non persistent

Vegetation Description: Nearly half shrub scrub and half emergent

Physical Description: Hummocky on ROW/access road to the East

Comments: Likley shallow water during spring, stream currently dry. Stream bed is 3' wide with muddy substrate. Banks are heavily covered with grasses and sedges. Two 36" culverts allow for crossing under the ROW access road.

Wetland Impact Area 38 **Date** 10/8/15 **Field Staff** HR and JV

Time 1:07 **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula**	H	*Onoclea sensibilis*
S	*Viburnum recognitum*	H	*Eutrochium sp*
S	*Salix sp*	H	*Typha latifolia*
S	*Ilex verticillata*	H	*Scirpus cyperinus**
H	*Carex stricta*	S	*Spiraea tomentosa*
H	*Lythrum salicaria*	H	*Euthamia graminifolia*
H	*Symphyotrichum puniceum*	H	*Carex lurida*
H	*Thelypteris palustris*	M	*Sphagnum sp*
		H	*Solidago rugosa**

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 39 **Date** 10/8/15 **Field Staff** HR and JV

Time 1:23pm **Town** Tewksbury

Associated Waterway or Waterbody ___

Photos #11, view to the north

Weather Conditions Sunny, 60F

Total Area Affected (SF) ___

Waterway/Waterbody Impact - Linear Feet (bank) ___ **and/or area (sf) (LUW)** ___

BVW area (sf) x **Upland RFA area (sf)** ___ **Upland BLSF area (sf)** ___

Site Description: Isolated vegetated wetland

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ___ **Depth to Water Table** ~6"

Vegetation Community Name: Scrub shrub deciduous

Vegetation Description: tall, shrubby wetland on maintained ROW

Physical Description: Generally level, dense shrub layer

Comments:

Wetland Impact Area 39 **Date** 10/8/15 **Field Staff** HR and JV

Time 1:23pm **Town** Tewskbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Ilex verticillata**		
S	*Rhamnus frangula**		
H	*Rhamnus frangula**		
H	*Solidago rugosa**		
H	*Rubus hispidus*		
H	*Osmunda regalis*		
L	*Parthenocissus quinquefolia*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 40 **Date** 10/8/15 **Field Staff** HR and JV
Time 2:08 **Town** Tewskbury

Associated Waterway or Waterbody ____

Photos #14, view to the west

Weather Conditions Sunny, 63F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) ____ **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description:

Soils

Soil Survey Unit Woodbridge FSL **Drainage Class** Moderately well drained

Texture Upper Part FSL **Depth** ____ **Depth to Water Table** ~18"

Vegetation Community Name: Shrub scrub deciduous

Vegetation Description: Shrub scrub wetland within maintained ROW

Physical Description: Low spot on southern edge of access road extnding south, dry stream crosses through mostly shrubby wetland.

Comments: Banks of the dry stream are heavily populated by grasses and sedges, with some mosses in the stream bed. Stream bed no more than 3' across with 6"-7" banks.

Wetland Impact Area 40 **Date** 10/8/15 **Field Staff** HR JV

Time 2:08pm **Town** Tewskbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula**	H	*Thelypteris palustris*
S	*Viburnum recognitum**	S	*Pinus strobus*
S	*Ilex verticillata*	M	*Sphagnum sp*
H	*Carex stricta*	H	*Euthamia graminifolia*
H	*Lythrum salicaria*	H	*Solidago rugosa*
H	*Symphyotrichum puniceum*	H	*Spiraea latifolia*
H	*Eutrochium sp.*	L	*Vitis sp.*
H	*Onoclea sensibilis*	S	*Rubus argutus*

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 41 **Date** 10/8/15 **Field Staff** HR and JV

Time 2:48pm **Town** Tewksbury

Associated Waterway or Waterbody Unnamed intermittent stream

Photos #16 (#15), view to the north, #17 view to the south, #18 view to the south, #19 view to the south

Weather Conditions Sunny, 65F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: On maintained ROW, emergent marsh wetland with some shrub scrub areas

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: Persistent emergent marsh and deciduous shrub scrub

Vegetation Description: mix of emergent cattail marsh with interpersed shrubs. Shrubs fringe intermittent stream.

Physical Description: Stream slightly braided. Larger area is hummocky. Banks 6-10" with roots and dense vegetation.

Comments: Stream variable width, at times braided. Muddy bottom, 3-4' wide. Cattail marsh likely ponds water up to 6" in the spring. Some aquatic plants suggestive of deeper water in some locations up to 1' (Sagattara sp).

Wetland Impact Area 41 **Date** 10/8/15 **Field Staff** HR and JV

Time 2:48 **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia**	H	*Rosa multiflora*
S	*Rhamnus frangula**	S	*Euthamia graminifolia*
S	*Ilex verticillata*		
T	*Salix sp.*		
H	*Phalaris arundinacea*		
H	*Solidago rugosa**		
H	*Lythrum salicaria*		
H	*Carex stricta*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 42 **Date** 10/8/15 **Field Staff** HR and JV

Time 3:05pm **Town** Tewksbury

Associated Waterway or Waterbody Unnamed intermittent stream

Photos #20 view to the west, #21 view to the south, #22 view to the west, #23 view to the west, #24 view west

Weather Conditions Sunny, 63F

Total Area Affected (SF) ______________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** __________

BVW area (sf) x **Upland RFA area (sf)** _________ **Upland BLSF area (sf)** _________

Site Description: Forested area along maintained ROW

Soils

Soil Survey Unit Ridgebury FSL **Drainage Class** Poorly drained

Texture Upper Part FSL, stony **Depth** _______ **Depth to Water Table** ~6"

Vegetation Community Name: Forested wetland, deciduous

Vegetation Description: Mixed deciduous trees of varying size

Physical Description: Low area along edge of maintained ROW. Areas exhibiting ponding for prolonged periods of time. Area in the north of the wetland resembles vernal pool but is connected to a stream which flows from the south.

Comments: Muddy substrate, UEG suggestive of semi-perm hyrdology. Stream channel is braided with rocky substrate. Banks includes stones of various shapes and sizes as well as exposed roots. Abundant mossy rocks and areas of undercut banks throughout stream. Blow downs and dead wood abundant throughout area. Invasives abundant. Some large trees, mostly medium and small.

Wetland Impact Area 42 **Date** 10/8/15 **Field Staff** HR and JV

Time 3:05 **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	**Plant Species**	**Strata**	**Plant Species**
T	*Ulmus americana**	S	*Rhamnus cathartica*
T	*Betula alleghaniensis*	T	*Fraxinus americana*
S	*Cornus amomum*	L	*Celastrus orbiculatus*
S	*Cephalanthus occidentalis*	S	*Rhamnus frangula**
T	*Acer rubrum*	S	
H	*Sagittaria sp.*	H	*Onoclea sensibilis**
S	*Berberis thunbergii*	H	*Eurybia divaricata*
S	*Ilex verticillata*	T	*Quercus alba*
S	*Rosa multiflora*	H	*Osmundastrum cinnamomeum*
		H	*Toxicodendron radicans*

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 43 **Date** 10/8/15 **Field Staff** HR and JV

Time 3:52pm **Town** Tewksbury

Associated Waterway or Waterbody Unnamed intermittent stream

Photos #24

Weather Conditions Sunny, 65F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: On ROW, but not mainatined regularly

Soils

Soil Survey Unit Whitman FSL **Drainage Class** Very poorly drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: Deciduous shrub scrub and some non-pesistent emergent sections

Vegetation Description: Dominated by dense tall shrubs

Physical Description: Area borders along stream on the eastern side, which is non maintained and forested

Comments: Some areas along treeline likely to pond water up to 6" in pockets

Wetland Impact Area 43 **Date** 10/8/15 **Field Staff** HR and JV

Time 3:52pm **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula*	S	*Viburnum recognitum*
S	*Ilex verticillata*	H	*Euthamia caroliniana*
H	*Solidago rugosa*	S	*Cornus amomum*
H	*Iris versicolor*	S	*Rosa multiflora*
H	*Scirpus cyperinus*	H	*Carex intumescens*
H	*B vervain*	H	*Symphyotrichum puniceum*
H	*Lythrum salicaria*	H	*Epilobium sp.*
H	*Mimulus sp.*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 44 **Date** 10/14/15 **Field Staff** HR and JV

Time 9:40am **Town** Tewksbury

Associated Waterway or Waterbody ______

Photos #1, view to the south

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Wetland within maintained portion of the ROW

Soils

Soil Survey Unit Woodbridge FSL **Drainage Class** Moderately well drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~18"

Vegetation Community Name: Primarily shrub scrub with about 30% of the area being emergent marsh

Vegetation Description: Mix of shrubs (invasives)and patches of emergent mixed grass and cattail wetlands

Physical Description: Area south of Route 38, adjacent to Fairfield Inn to the west

Comments: Area contains dry, braided stream/drainage way which largely runs from west to east. Gray fox seen.

Wetland Impact Area 44 **Date** 10/14/15 **Field Staff** HR and JV

Time 9:40am **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus frangula**	H	*Osmundastrum cinnamomeum*
S	*Ilex verticillata*	H	*Phalaris canariensis*
S	*Rosa multiflora*	H	*Scirpus cyperinus*
H	*Typha latifolia*	H	*Grum sp.*
H	*Solidago rugosa **	L	*Celastrus orbiculatus*
H	*Solidago altissima*	H	*Rumex sp.*
H	*Lythrum salicaria*	H	*Symphyotrichum puniceum*
H	*Onoclea sensibilis*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 45 **Date** 10/14/15 **Field Staff** HR and JV

Time 10:11am **Town** Tewksbury

Associated Waterway or Waterbody Intermittent stream/drainage ditch

Photos #2, view to the west

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Drainage ditch/stream on ROW, poorly maintained

Soils

Soil Survey Unit Montauk FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~18"

Vegetation Community Name: Shrub scrub w/ intermittent stream

Vegetation Description: Drainage thicket of shrubs and lianas

Physical Description: Adjacent to road on ROW. Likley receives drainage from road to industrial park.

Comments: Dominated by invasives. Intermisttent stream is channelized and has pooor water quality. Bank is greater than 6" and vegetated by a variety of herbaceous species.

Wetland Impact Area 45 **Date** 10/14/15 **Field Staff** HR and JV

Time 10:11am **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	*Rhamnus fragula**	S	*Rhus typhina*
S	*Rosa multiflora**		
S	*Alnus incana*		
L	*Celastrus orbiculatus**		
H	*Symphyotrichum puniceum*		
H	*Lactua sp.*		
H	*Lythrum salicaria*		
S	*Spirea latifolia*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 46 **Date** 10/14/15 **Field Staff** HR and JV

Time 10:23am **Town** Tewksbury

Associated Waterway or Waterbody ____

Photos #3, view to the northeast

Weather Conditions partally cloudy, 50F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) x **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description: On naintained ROW, largey shrubby, poorly maintained

Soils

Soil Survey Unit Montauk FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ____ **Depth to Water Table** ~18"

Vegetation Community Name: Shrub scrub

Vegetation Description: Dense thicket dominated by invasive shrubs, vines, and herbaceous species

Physical Description: Adjacent to channalized, steeply sided stream on ROW

Comments: Stream hard to locate in thicket. Likley similar to stream segment within WA43.

Wetland Impact Area 42 **Date** 10/14/15 **Field Staff** HR and JV

Time 10:23 **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
S	_Rhmanus frangula_*	H	_Eutrochium_
S	_Rosa multiflora_*		
S	_Cornus amomum_		
L	_Celastrus orbiculatus_*		
S	_Celastrus orbiculatus_		
H	_Solidago rugosa_		
H	_Solidago altissima_		
S	_Lonicera sp._		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 47 **Date** 10/14/15 **Field Staff** HR an JV

Time 10:35am **Town** Tewskbury

Associated Waterway or Waterbody Intermitent stream/drainage ditch

Photos #4, view to the west

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) X **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Drainage ditch/Intermittent stream adjacent to Industrial Park Road and ROW access road. Likley holds drainage from roads.

Soils

Soil Survey Unit Montauk FSL **Drainage Class** Well drained

Texture Upper Part FSL **Depth** ______ **Depth to Water Table** ~18"

Vegetation Community Name: Emeregent marsh

Vegetation Description: Primarily mixed herbs bordering on the ditch.

Physical Description: Under powerlines, northern and southern edges sloped towards drainage ditch.

Comments: ROW access road is much higher than the wetlands, could not locate culvert

Wetland Impact Area 47 **Date** 10/14/15 **Field Staff** HR and JV

Time 10:35 **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia**		
H	*Phalaris arundinacea**		
H	*Solidago rugosa**		
H	*Symphyotrichum puniceum*		
S	*Rhamnus frangula*		
S	*Rosa multiflora*		
H	*Lythrum salicaria*		
L	*Celastrus orbiculatus*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 48 **Date** 10/14/15 **Field Staff** HR and JV

Time 11:30am **Town** Tewksbury

Associated Waterway or Waterbody ____________

Photos #7, view to the south

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Cattail marsh on ROW with snags

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~3"

Vegetation Community Name: Persistent emergent marsh

Vegetation Description: Primariy cattails

Physical Description: flat and wet area that likley ponds water up to 6" or more

Comments: Small forested componnet on northern edge with snags, some with exfoliated bark. Snags are within the 6"-10" DBH category and provide perches for birds including fly catchers.

Wetland Impact Area 48 **Date** 10/14/15 **Field Staff** HR and JV

Time 11:30 **Town** Tewskbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia**	H	*Solidago rugosa*
H	*Lythrum salicaria*		
H	*Bidens sp*		
H	*Onoclea sensibilis*		
T	*Acer rubrum*		
S	*Rhamnnis frangula*		
T	*Betula populifolia*		
S	*Vaccinium corymbosum*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 49 **Date** 10/14/15 **Field Staff** HR and JV

Time 11:15am **Town** Tewksbury

Associated Waterway or Waterbody ____________

Photos #5, south west and #6 south west

Weather Conditions partly cloudy, 50F

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Cattail marsh within ROW

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~3"

Vegetation Community Name: Emergent marsh within a ROW

Vegetation Description: Area dominated by cattail marsh

Physical Description: Flat and wet, likley to pond water up to 6".

Comments: 4-5 snags within impact area

Wetland Impact Area 49 **Date** 10/14/15 **Field Staff** HR and JV

Time 11:15am **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia**		
H	*Lythrum salicaria*		
H	*Bidens sp*		
H	*Onoclea sensibilis*		
S	*Rhmanus frangula*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 50 **Date** 10/14/15 **Field Staff** HR and JV

Time 11:49am **Town** Tewksbury

Associated Waterway or Waterbody ________

Photos #8, view to the south

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Access road that crosses emergent wetland with ponded water. Area likley floods over in the spring.

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~3"

Vegetation Community Name: Persistent emergent marsh with a few trees and snags fringing on the edge of the impact area and on the edge of the access road.

Vegetation Description: Primarily mixed grass and broad leaved cattail

Physical Description: Filled access road within a wetland

Comments: Some trees and snags along the access road edge are likley to be removed. Road partially floods over in spring and winter especially. Water is persistent now at 6"-12" along the southern side of the access road.

Wetland Impact Area 50 **Date** 10/14/15 **Field Staff** HR and JV

Time 11:49am **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Echinochloa*	S	*Chamaedaphne calyculata*
H	*Thelypteris palustris*	H	*Symphyotrichum puniceum*
H	*Typha latifolia**	H	*Scirpus cyperinus*
H	*Bidens sp*	H	*Asclepias incarnata*
S	*Rhmanus frangula**	H	*Carex crinata*
H	*Salix sp*	T	*Betula populifolia*
H	*Osmundastrum cinnamomeum*	S	*Lyonia ligustrina*
H	Mixed grasses and herbs*	S	*Ilex verticillata*
S	*Vaccinium corymbosum*	S	*Toxidendron vernix*
H	*Onoclea sensibilis*	S	*Viburnum recognitum*
S	*Clethra sp.*	H	*Eutrochium*

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 51 **Date** 10/14/15 **Field Staff** HR and JV

Time 12:16pm **Town** Tewksbury

Associated Waterway or Waterbody ____

Photos #9, view to the west

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) x **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** ____

Site Description: Unmaintained portion of ROW

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ____ **Depth to Water Table** ~3"

Vegetation Community Name: Mostly emergent marsh with a forested fringe to the south

Vegetation Description: Marshy area fringed by trees

Physical Description: Low, wet marshy area bordered by upland forest (predominantly white pine)

Comments: Few low snags. Trees fringe wetland but are in the upland portion of the area. Standing water present at surface of the area.

Wetland Impact Area 51 **Date** 10/14/15 **Field Staff** HR and JV

Time 12:16pm **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	Mixed grasses	H	*Osmundastrum cinnamomeum*
H	*Craex crinata*		
H	*Typha latifolia*		
S	*Vaccinium corymbosum*		
H	*Lythrum salicaria*		
T	*Acer rubrum*		
T	*Pinus strobus*		
H	*Bidens sp.*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 52 **Date** 10/14/15 **Field Staff** HR and JV

Time 12:27pm **Town** Tewksbury

Associated Waterway or Waterbody ____________________

Photos #10, view to the east

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ____________

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ________

BVW area (sf) x **Upland RFA area (sf)** ________ **Upland BLSF area (sf)** ________

Site Description: Emergent marsh on maintained ROW

Soils

Soil Survey Unit Swansea muck **Drainage Class** Very poorly drained

Texture Upper Part Organic **Depth** ________ **Depth to Water Table** ~3"

Vegetation Community Name: Persistent emeregent marsh

Vegetation Description: Cattail marsh with fringe of shrubs

Physical Description: Flat and wet, likely to pond 6" or more

Comments:

Wetland Impact Area 52 **Date** 10/14/15 **Field Staff** HR and JV

Time 12:27 **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia*		
H	*Lythrum salicaria*		
S	*Rhamnus frangula*		
S	*Betula populifolia*		
H	*Carex crinata*		
S	*Alnus incana*		
M	*Sphagnum sp*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 53 **Date** 10/14/15 **Field Staff** HR and JV

Time 1:04pm **Town** Tewksbury

Associated Waterway or Waterbody ____

Photos #12, view to the south

Weather Conditions Cloudy, 50F

Total Area Affected (SF) ____

Waterway/Waterbody Impact - Linear Feet (bank) ____ **and/or area (sf) (LUW)** ____

BVW area (sf) ____ **Upland RFA area (sf)** ____ **Upland BLSF area (sf)** x

Site Description: Upland floodplain area

Soils

Soil Survey Unit Windsor loamy sand **Drainage Class** Excessively drained

Texture Upper Part loamy sand **Depth** ____ **Depth to Water Table** ~80"

Vegetation Community Name: Upland floodplain area, mainly deciduous forest

Vegetation Description: Large upland trees and shrubs

Physical Description: Floodplain at the edge of the wetlands, sloped to the south

Comments: Little to no herbaceous layer

Wetland Impact Area 53 **Date** 10/14/15 **Field Staff** HR and JV

Time 1:04pm **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
T	*Pinus strobus**		
T	*Quercus rubra**		
S	*Hamamelis virginiana*		
S	*Clethra**		
S	*Vaccinium corymbosum*		
T	*Fagus grandifolia*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 54 **Date** 10/14/15 **Field Staff** HR and JV

Time 12:52pm **Town** Tewksbury

Associated Waterway or Waterbody ______

Photos #11, view to the northeast

Weather Conditions Cloudy, 50F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) x **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Area mostly within mainatined ROW, large wetland

Soils

Soil Survey Unit Freetown muck **Drainage Class** Poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: Persistent emergent marsh (2/3 of area) and deciduous shrub scrub (1/3 of the area)

Vegetation Description: Complex mix of cattail marsh and shrubs

Physical Description: On maintained ROW, mix of emergent marsh and shrub scrub, with pockets of ponded water

Comments: Very wet area in springtime with standing water throughout. High interspersion of cover types

Wetland Impact Area 54 **Date** 10/14/15 **Field Staff** HR and JV

Time 12:52pm **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Typha latifolia**	H	*Thelypteris palustris*
H	*Bidens sp*	H	*Carex crinata*
H	*Lythrum salicaria*	S	*Lyonia ligustrina*
H	*Onoclea sensibilis*		
S	*Ilex verticillata*		
S	*Alnus incana*		
S	*Toxidendron vernix*		
H	*Eutrochium*		

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 55 **Date** 10/14/15 **Field Staff** HR and JV

Time 1:20pm **Town** Tewksbury

Associated Waterway or Waterbody ______

Photos #13 (south), #14 (east), #15 (southwest), #16 (east), #17 (west), #18 (southeast)

Weather Conditions ______

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Deciduous forested wetland just off of ROW with complex series of pools and streams throughout entire impact area

Soils

Soil Survey Unit Freetown muck **Drainage Class** Poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~6"

Vegetation Community Name: Deciduous forested wetland

Vegetation Description: Completely forested wetland

Physical Description: Unmaintained portion of ROW

Comments: Evidence of flooding throughout area. Hummocky topography. Amphibian breeding ground throughout area. Soft mucky soils and mossy banks on hummocks. Abundance of exposed roots and dead wood. Complex network of pools and areas with slowly flowing water.

Wetland Impact Area 55 **Date** 10/14/15 **Field Staff** HR and JV

Time 1:20pm **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
T	*Acer rubrum**	H	*Osmunda regalis*
S	*Clethra**	S	*Rhamnus frangula*
H	*Osmundastrum cinnamomeum*	S	*Vaccinium corymbosum*
H	*Onoclea sensibilis*	H	
S	*Ilex verticillata*	T	*Larix laricina*
H	*Carex crinata*	T	*Betula populifolia*
S	*Toxidendron vernix*	T	*Picea mariana*
S	*Rhododendron viscosum*	H	*Bidens sp*

MVRP Massachusetts Wetland Wildlife Habitat Evaluation

Wetland Impact Area 57 **Date** 10/14/15 **Field Staff** HR and JV

Time 2:35pm **Town** Tewksbury

Associated Waterway or Waterbody ______

Photos #19 view to the south, #20 view to the northwest

Weather Conditions Partly cloudy, 50F

Total Area Affected (SF) ______

Waterway/Waterbody Impact - Linear Feet (bank) ______ **and/or area (sf) (LUW)** ______

BVW area (sf) ______ **Upland RFA area (sf)** ______ **Upland BLSF area (sf)** ______

Site Description: Mainatined portion of ROW under powerlines

Soils

Soil Survey Unit Freetown muck **Drainage Class** Poorly drained

Texture Upper Part Organic **Depth** ______ **Depth to Water Table** ~6 inches

Vegetation Community Name: Emergent marsh with persistent and non-persistent portions

Vegetation Description: Mix of emergents, roughly 1/3 phragmites, 1/3 mixed herbaceous species and goldenrod, and 1/3 cattails

Physical Description: North of substation 22, borders chain link fence around the property

Comments:

Wetland Impact Area 57 **Date** 10/14/15 **Field Staff** HR and JV

Time 2:35pm **Town** Tewksbury

Plant List (species that comprise 10% or more of the vegetative cover in each strata

("*" designates dominate plant species for each strata)

Strata	Plant Species	Strata	Plant Species
H	*Phragmites*	M	*Sphagnum*
H	*Solidago rugosa*	H	*Symphyotrichum puniceum*
H	*Rubus hispidus*	H	*Scirpus cyperinus*
S/H	*Rhamnus frangula*	H	*Carex stricta*
H	*Typha latifolia*	H	*Carex intumescens*
S	*Betula populifolia*	H	*Eupatorium perfoliatum*
H	*Phalaris arundinacea*	S	*Salix sp*
S/H	*Salix tomentosa*		

Appendix E:
Photographs

PHOTOGRAPHIC LOG

Client Name:	Site Location: Dracut, MA	Project No. 12650.00

Photo No.	Date:
1	9/17/15

Direction Photo Taken:
East

Description:
View of IA1 within WA29

Photo No.	Date:
2	9/17/15

Direction Photo Taken:
Northeast

Description:
View of IA2 within WA29

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 3	**Date:** 9/17/15

Direction Photo Taken:
South

Description:
View of IA3 within WA28

Photo No. 4	**Date:** 9/17/15

Direction Photo Taken:
South

Description:
View of IA4 within WA28

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 5	**Date:** 9/17/15
Direction Photo Taken: NA	
Description: View of IA5 within WA26	

Photo No. 6	**Date:** 9/17/15
Direction Photo Taken: NA	
Description: View of IA6 within WA26	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 7	**Date:** 10/6/15

Direction Photo Taken:
East

Description:
View of IA7 within WA24

Photo No. 8	**Date:** 9/23/15

Direction Photo Taken:
West

Description:
View of IA8 within WA23

PHOTOGRAPHIC LOG		
Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 9	**Date:** 9/23/15
Direction Photo Taken: NA	
Description: View of IA9 within WA23	

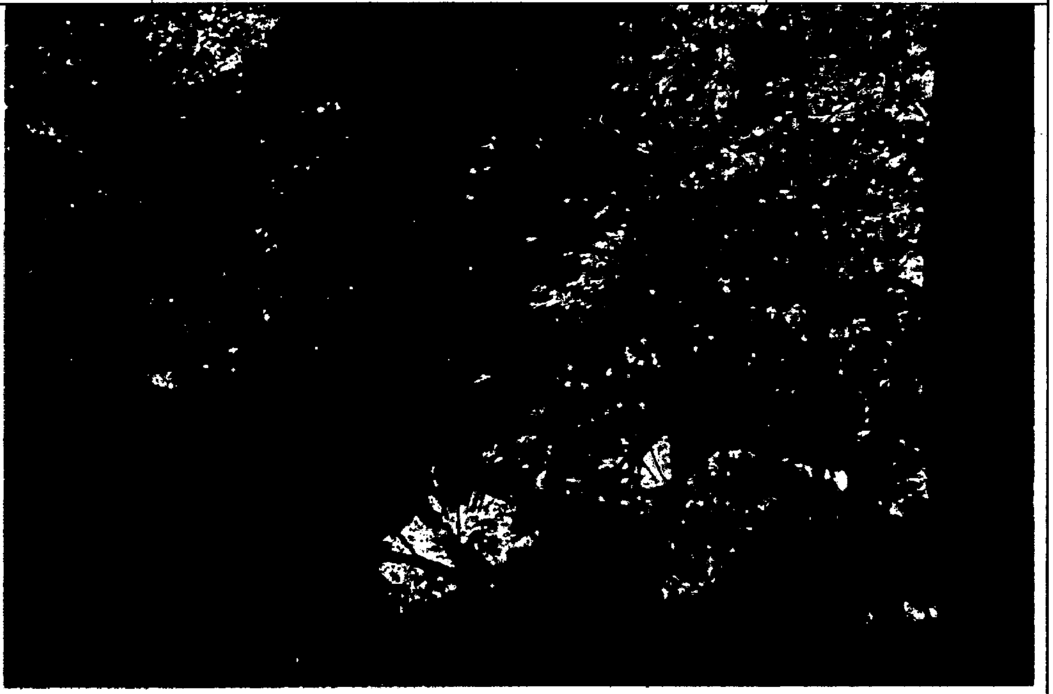
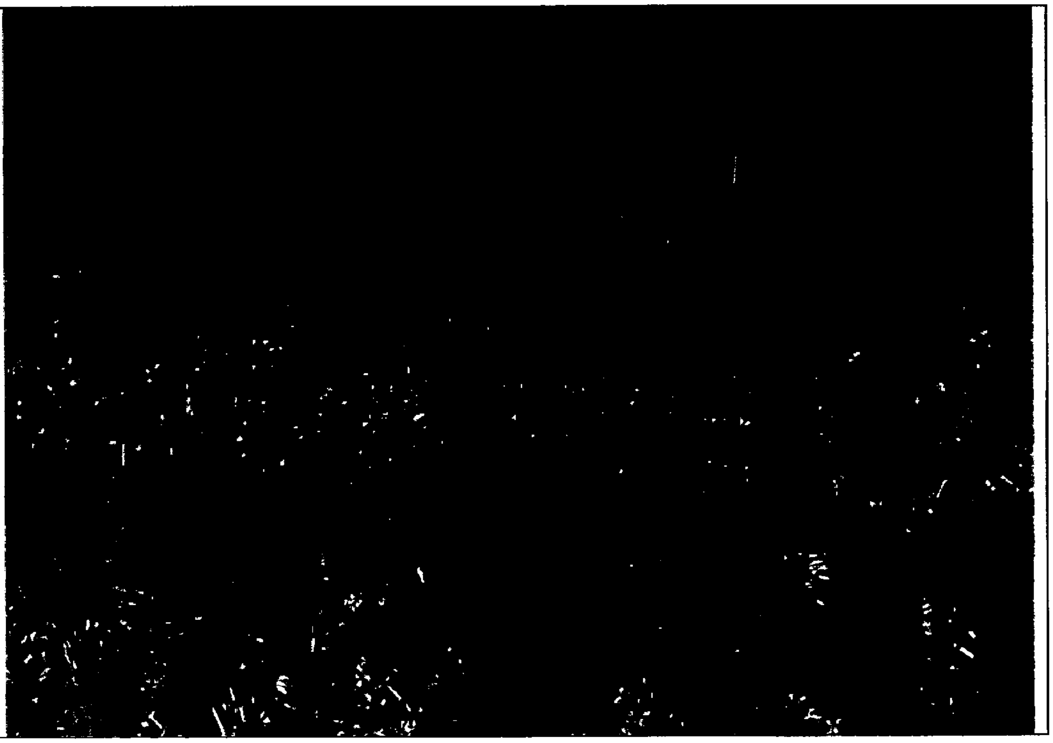


Photo No. 10	**Date:** 9/23/15
Direction Photo Taken: South	
Description: View of IA10 within WA23	



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
	Dracut, MA	12650.00

Photo No. 11 **Date:** 9/23/15

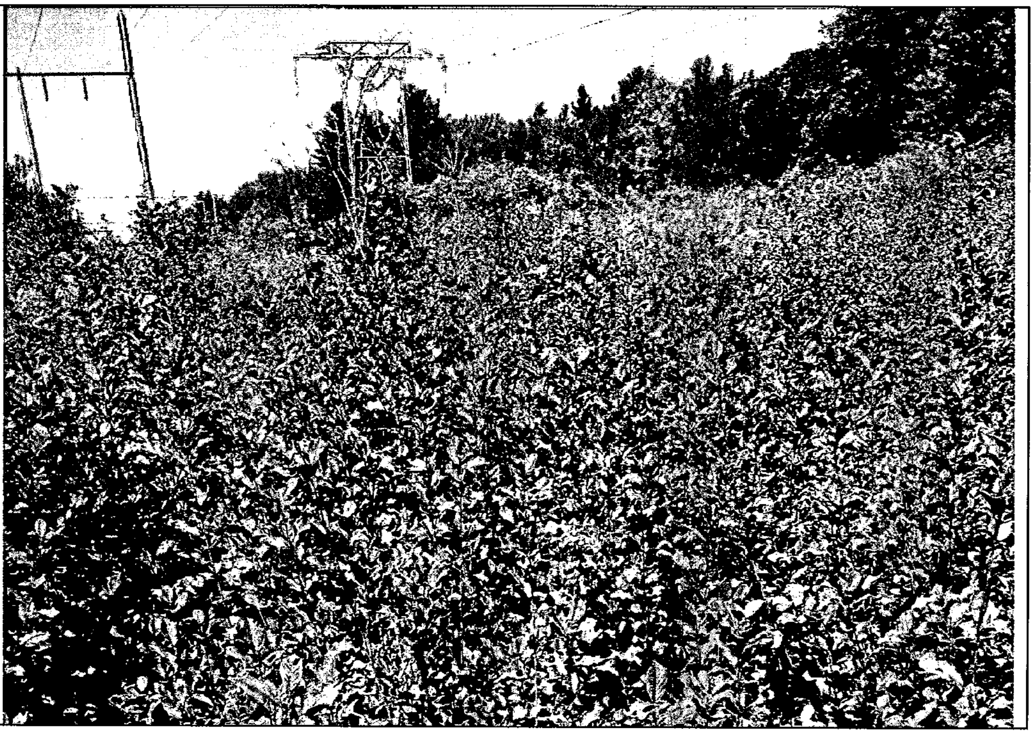
Direction Photo Taken:
North

Description:
View of IA11 within WA20

Photo No. 12 **Date:** 9/23/15

Direction Photo Taken:
North

Description:
View of IA13 within WA19



PHOTOGRAPHIC LOG		
Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 13	**Date:** 9/23/15
Direction Photo Taken: East	
Description: View of IA14 from within WA18	

Photo No. 14	**Date:** 9/23/15
Direction Photo Taken: Southeast	
Description: View of IA15 from within WA17A	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 15 **Date:** 9/23/15

Direction Photo Taken:
South

Description:
View of IA16 from within WA17A

Photo No. 16 **Date:** 10/6/15

Direction Photo Taken:
South

Description:
View of IA17 from within WA17A

PHOTOGRAPHIC LOG

Client Name:	Site Location: Dracut, MA	Project No. 12650.00

Photo No. 17	Date: 10/6/15
Direction Photo Taken: South	
Description: View of IA18 from within Trout Brook RFA	

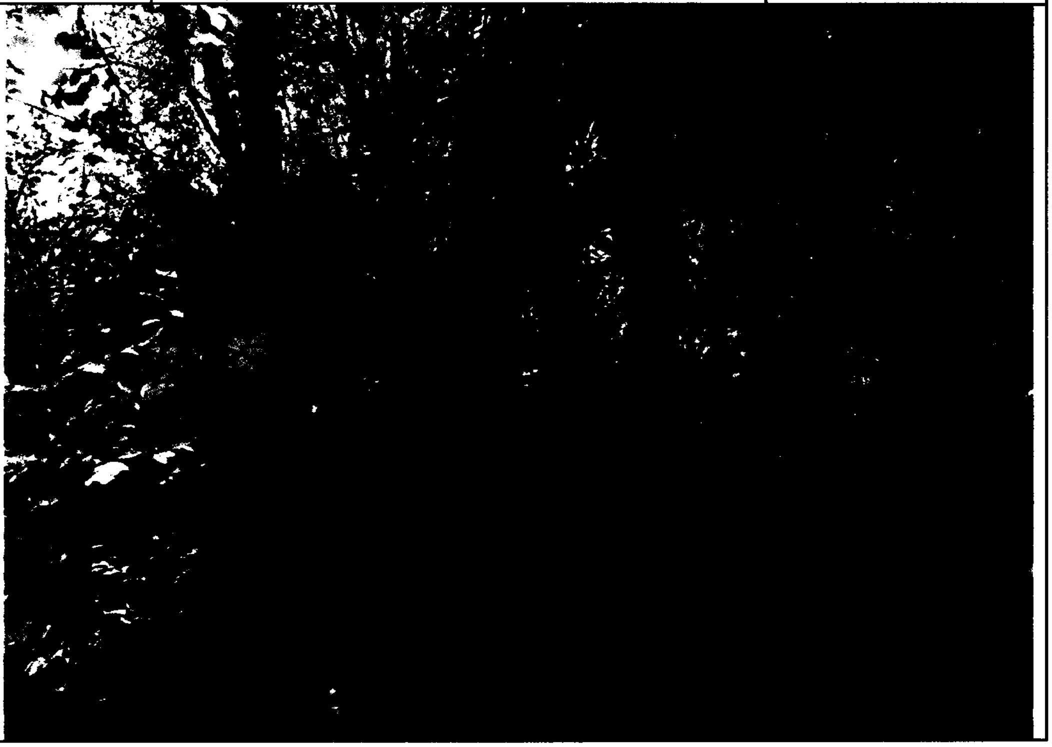
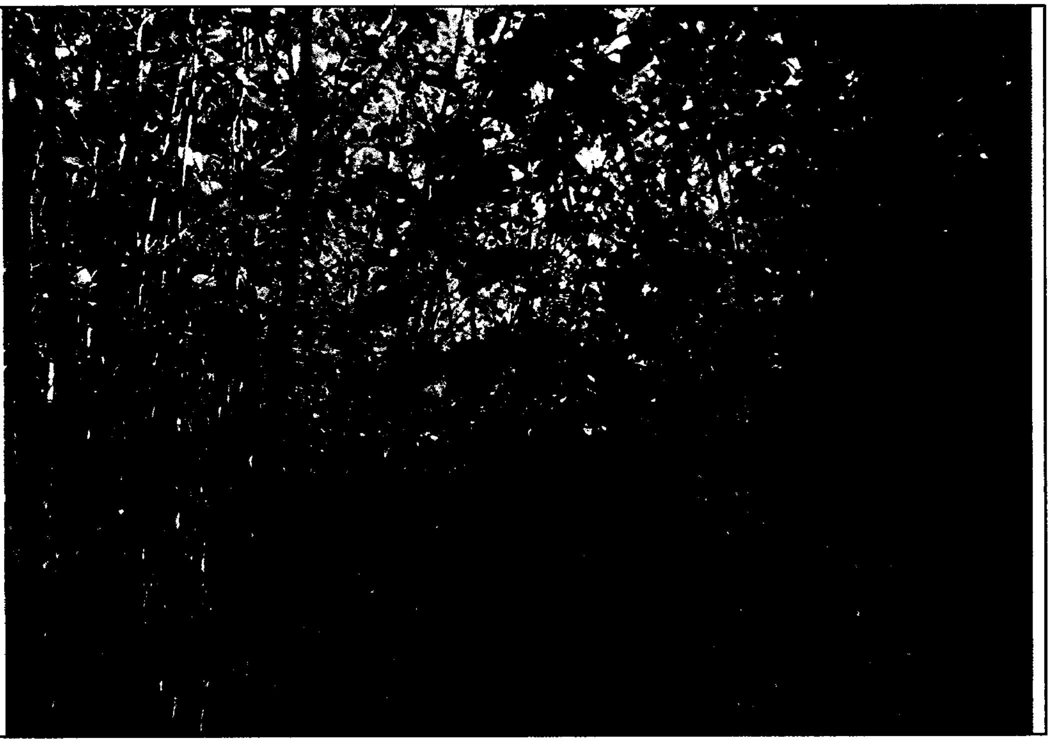


Photo No. 18	Date: 9/23/15
Direction Photo Taken: West	
Description: View of IA19 within Trout Brook RFA	



PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
	Drcaut, MA	12650.00

Photo No.	Date:
19	10/6/15

Direction Photo Taken:
South

Description:
View of IA20 within Trout Brook RFA

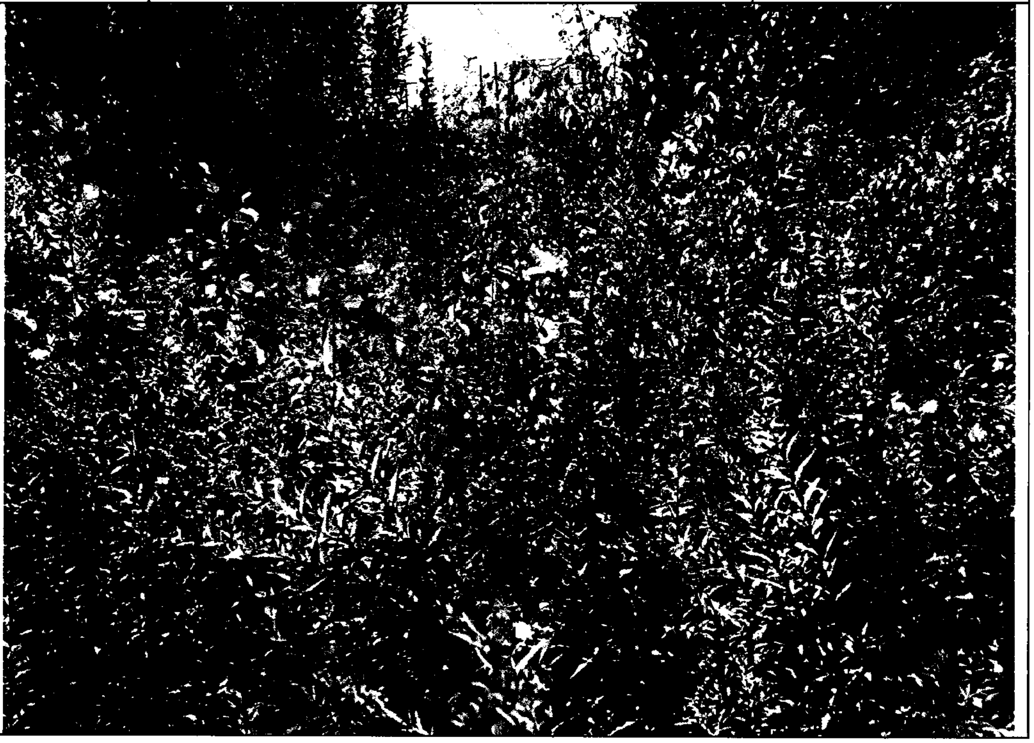


Photo No.	Date:
20	10/6/15

Direction Photo Taken:
East

Description:
View of IA21 within WA17

PHOTOGRAPHIC LOG

Client Name:	Site Location: Dracut, MA	Project No. 12650.00

Photo No. 21	Date: 9/23/15

Direction Photo Taken:
Northeast

Description:
View of IA22 within WA17

Photo No. 22	Date: 9/23/15

Direction Photo Taken:
West

Description:
View of WA23 within Trout Brook RFA

PHOTOGRAPHIC LOG

Client Name:	Site Location: Dracut, MA	Project No. 12650.00

Photo No. 23	Date: 9/23/15
Direction Photo Taken: Northwest	
Description: View of IA24 within Trout Brook RFA	

Photo No. 24	Date: 9/23/15
Direction Photo Taken: South	
Description: View of IA25 within Trout Brook RFA	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
	Dracut, MA	12650.00

Photo No.	Date:
25	10/6/15

Direction Photo Taken:
East

Description:
View of IA26 within Trout Brook RFA

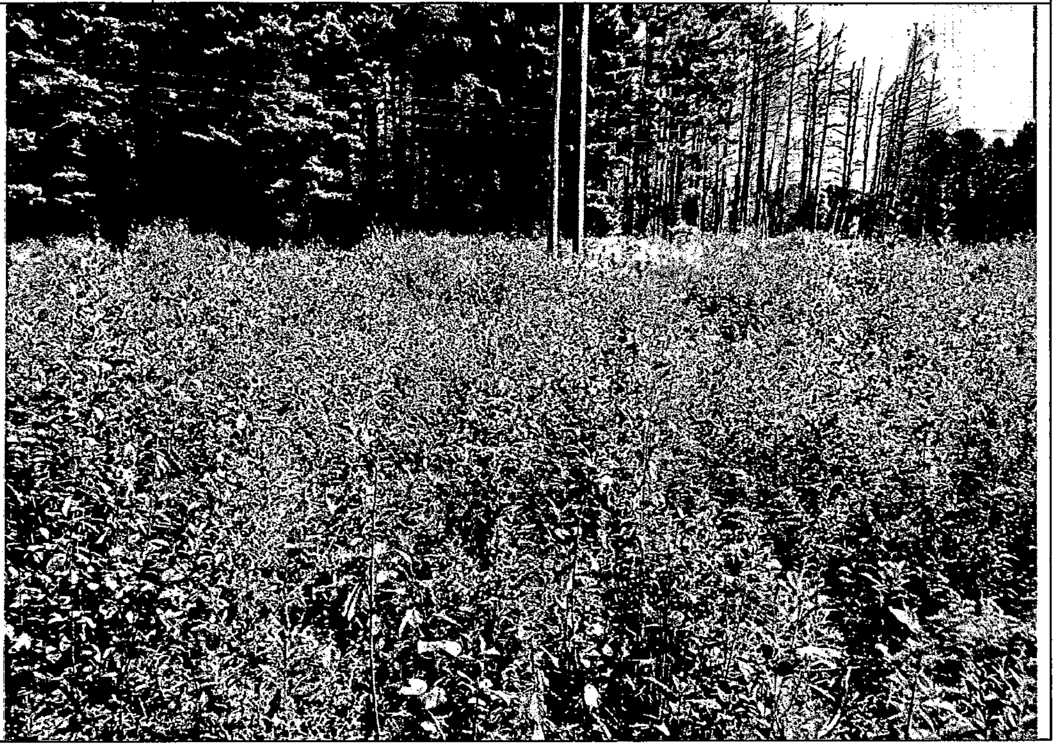
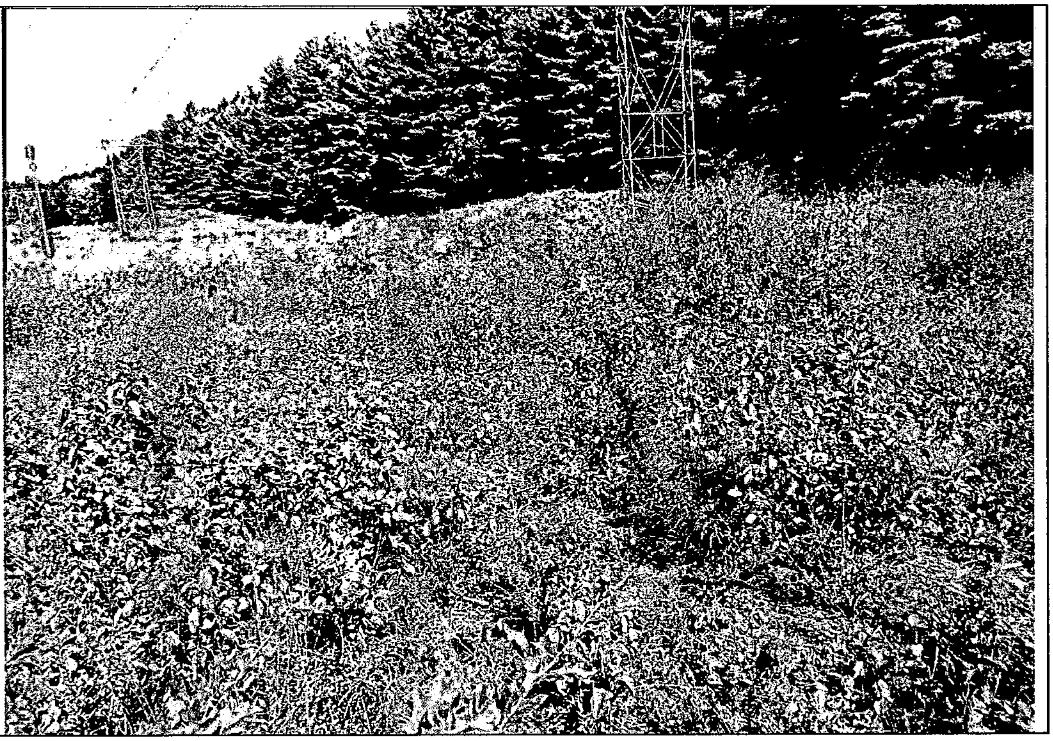


Photo No.	Date:
26	10/6/15

Direction Photo Taken:
Northeast

Description:
View of IA27 within Trout Brook RFA



PHOTOGRAPHIC LOG

Client Name:	Site Location: Dracut, MA	Project No. 12650.00

Photo No. 27	**Date:** 10/6/15
Direction Photo Taken: Northwest	
Description: View of IA28 within WA17	

Photo No. 28	**Date:** 10/8/15
Direction Photo Taken: West	
Description: View of IA	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 29	**Date:** 10/8/15

Direction Photo Taken:
West

Description:
View of IA30 within WA16

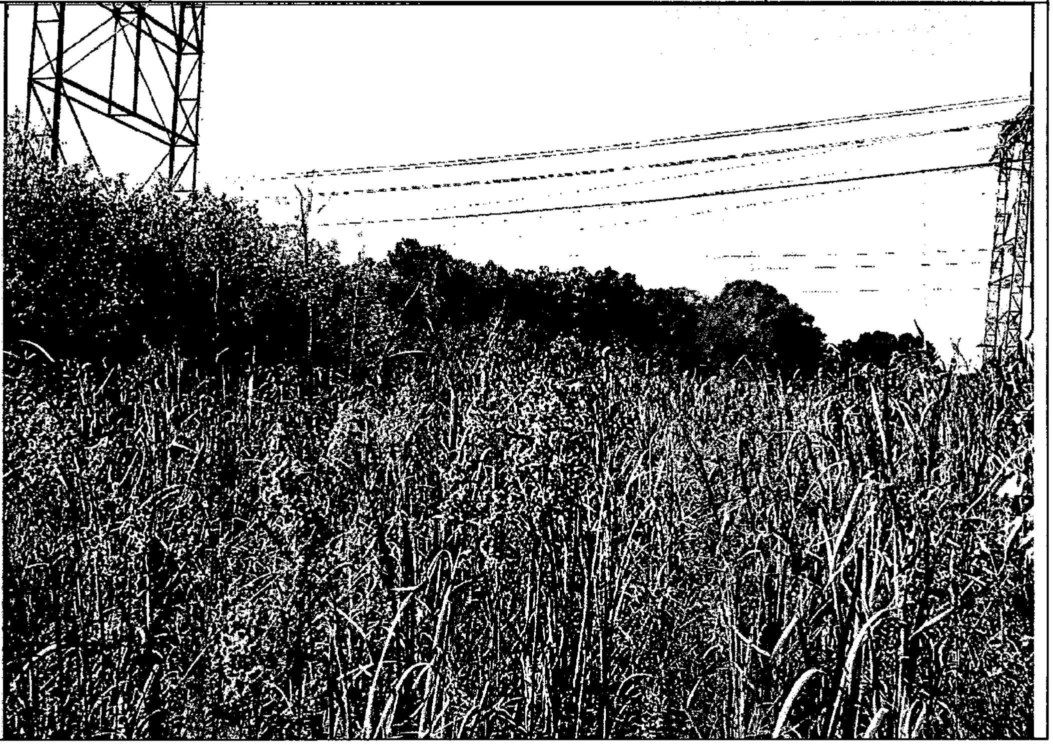
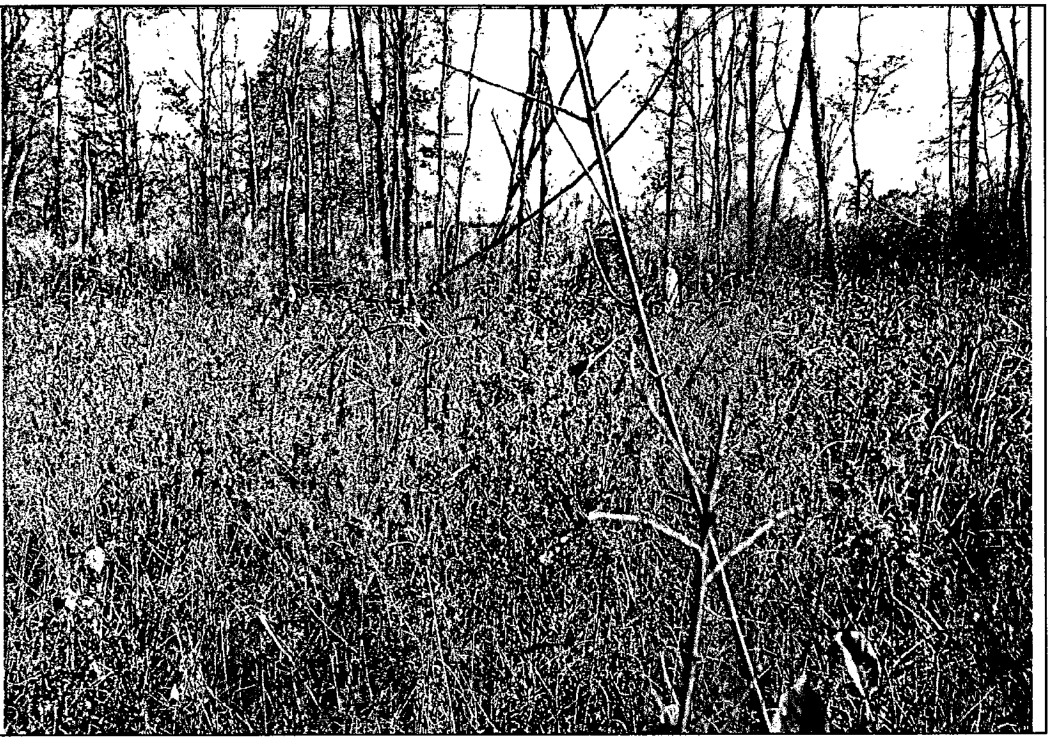


Photo No. 30	**Date:** 10/8/15

Direction Photo Taken:
East

Description:
View of IA31 from WA16



PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Dracut, MA	**Project No.** 12650.00

Photo No. 31	**Date:** 10/6/15

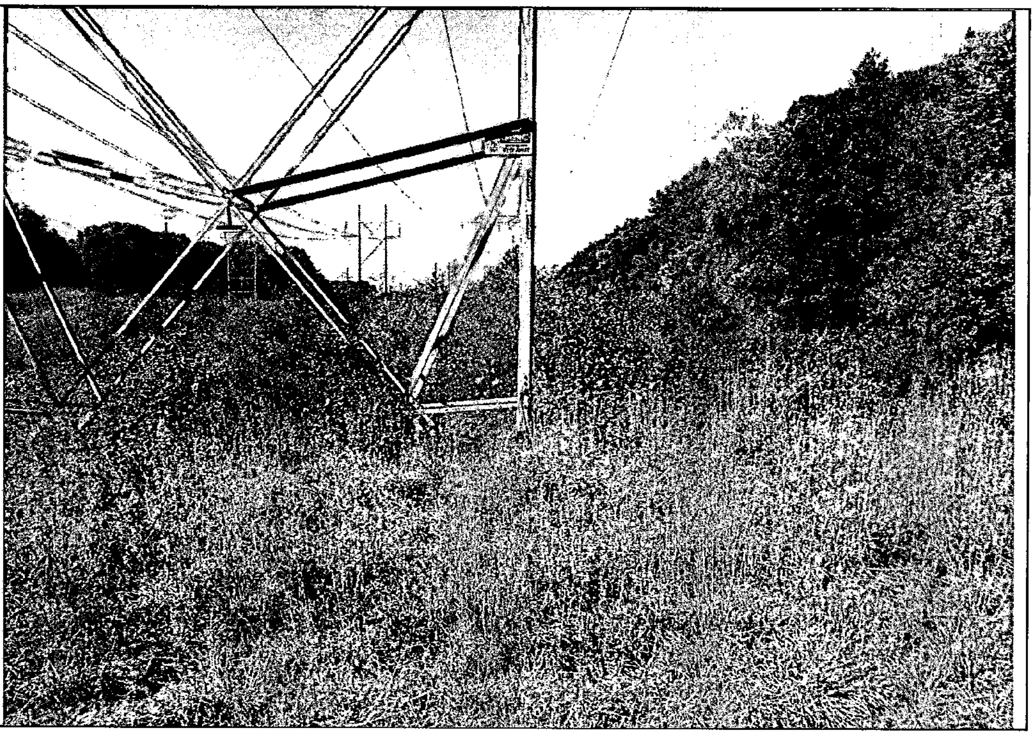
Direction Photo Taken:
North

Description:
View of IA32 within WA15A

Photo No. 32	**Date:** 10/6/15

Direction Photo Taken:
West

Description:
View IA33 within WA15A



PHOTOGRAPHIC LOG		
Client Name:	**Site Location:** Dracut, MA (33) and Andover, MA (34)	**Project No.** 12650.00

Photo No. 33	**Date:** 10/6/15
Direction Photo Taken: North	
Description: View of IA34 within WA13	

Photo No. 34	**Date:** 10/8/15
Direction Photo Taken: North	
Description: View of IA35 within WA	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
	Tewksbury, MA	12650.00

Photo No. 35

Date: 10/8/15

Direction Photo Taken: South

Description: View of IA36 within WA7B

Photo No. 36

Date: 10/8/15

Direction Photo Taken: West

Description: View of IA37 within WA7B

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Tewksbury, MA	**Project No.** 12650.00

Photo No. 37

Date: 10/8/15

Direction Photo Taken:
North

Description:
View of IA38 within WA7B

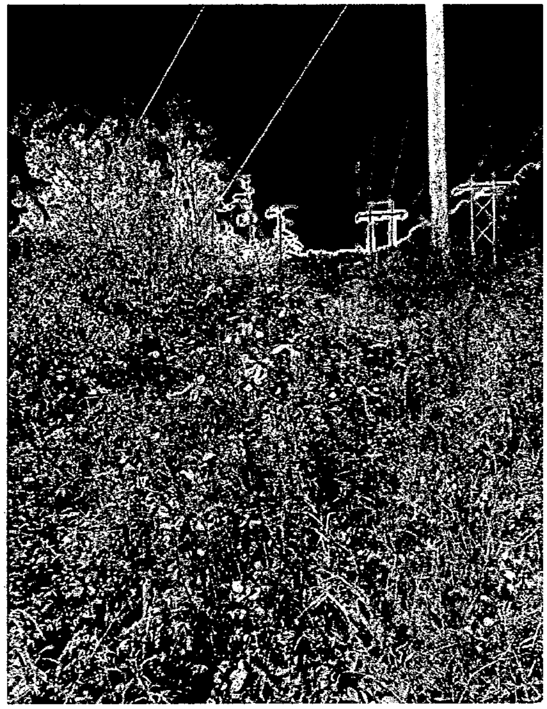


Photo No. 38

Date: 10/8/15

Direction Photo Taken:
North

Description:
View of IA39 within WA7C

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Tewksbury, MA	**Project No.** 12650.00

Photo No. 39

Date: 10/8/15

Direction Photo Taken:
West

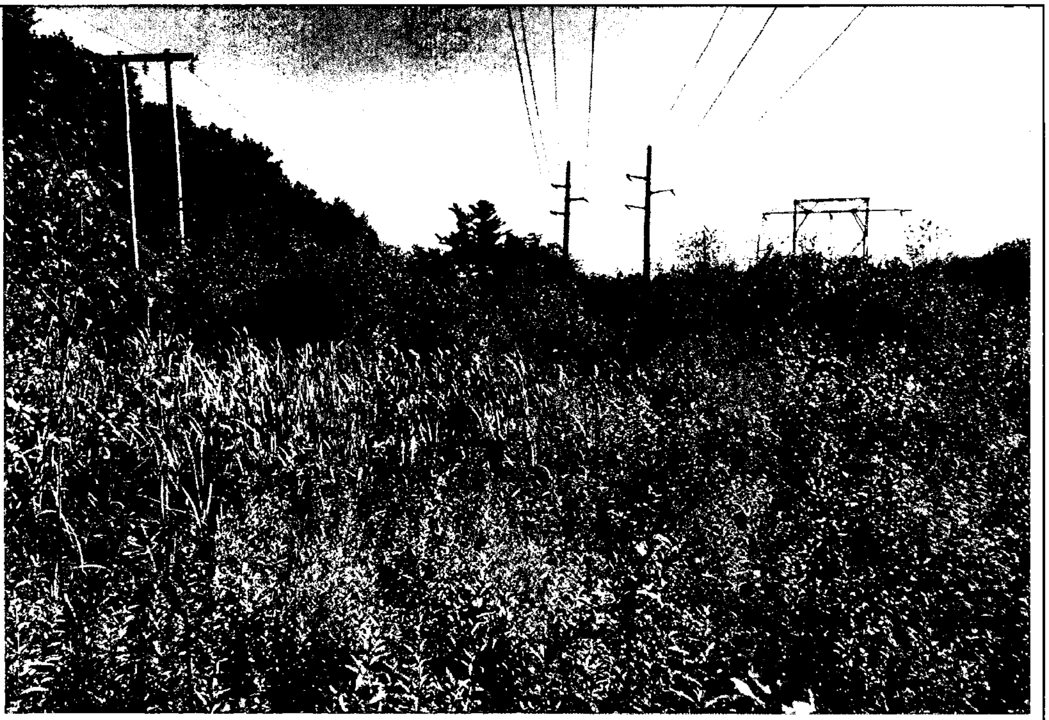
Description:
View of IA40 within WA7

Photo No. 40

Date: 10/8/15

Direction Photo Taken:
North

Description:
View of IA41 within WA7



PHOTOGRAPHIC LOG		
Client Name:	**Site Location:** Tewksbury, MA	**Project No.** 12650.00

Photo No. 41	**Date:** 10/8/15
Direction Photo Taken: West	
Description: View of IA42 within WA7	

Photo No. 42	**Date:** 10/8/15
Direction Photo Taken: Northeast	
Description: View of IA43 within WA7	

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Tewksbury, MA	**Project No.** 12650.00

Photo No. 43	**Date:** 10/14/15
Direction Photo Taken: South	
Description: View of IA44 within WA4	

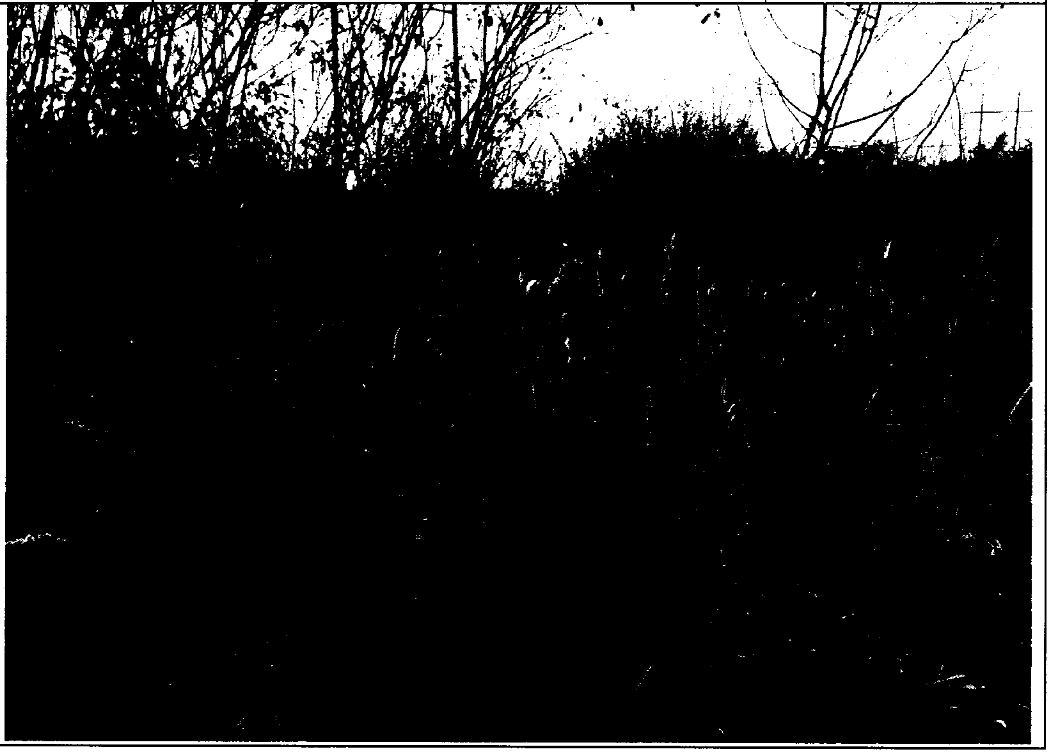


Photo No. 44	**Date:** 10/14/15
Direction Photo Taken: Northeast	
Description: View of IA45 within WA1C	

PHOTOGRAPHIC LOG		
Client Name:	**Site Location:** Tewksbury, MA	**Project No.**

Photo No. 45	**Date:** 10/14/15	
Direction Photo Taken: West		
Description: View of IA46 from within WA1A		

Photo No. 46	**Date:** 10/14/15	
Direction Photo Taken: West		
Description: View of IA47 within WA1A		

PHOTOGRAPHIC LOG

Client Name:	Site Location: Tewksbury, MA	Project No. 12650.00

Photo No. 47
Date: 10/14/15
Direction Photo Taken: Southwest
Description: View of IA48 within WA1A

Photo No. 48
Date: 10/14/15
Direction Photo Taken: South
Description: View of IA49 within WA1A

PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Tewksbury, MA	**Project No.** 12650.00

Photo No. 49	**Date:** 10/14/15
Direction Photo Taken: South	
Description: View of IA50 within WA1A	

Photo No. 50	**Date:** 10/14/15
Direction Photo Taken: West	
Description: View of IA51 within WA1A	

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
	Tewksbury, MA	12650.00

Photo No.
51

Date:
10/14/15

Direction Photo Taken:
East

Description:
View IA52 within WA1A

Photo No.
52

Date:
10/14/15

Direction Photo Taken:
South

Description:
View of IA53 within WA1

PHOTOGRAPHIC LOG		
Client Name:	**Site Location:** Tewksbury, MA	**Project No.** 12650.00

Photo No. 53	**Date:** 10/14/15
Direction Photo Taken: Northeast	
Description: View of 1A54 within WA1	

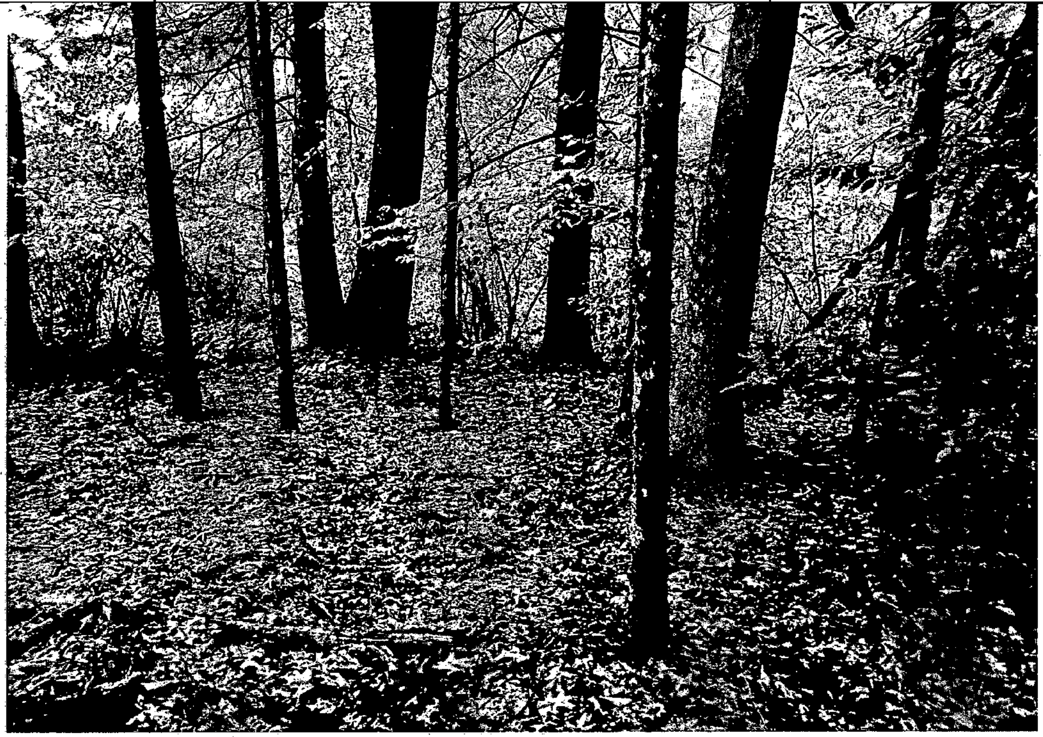
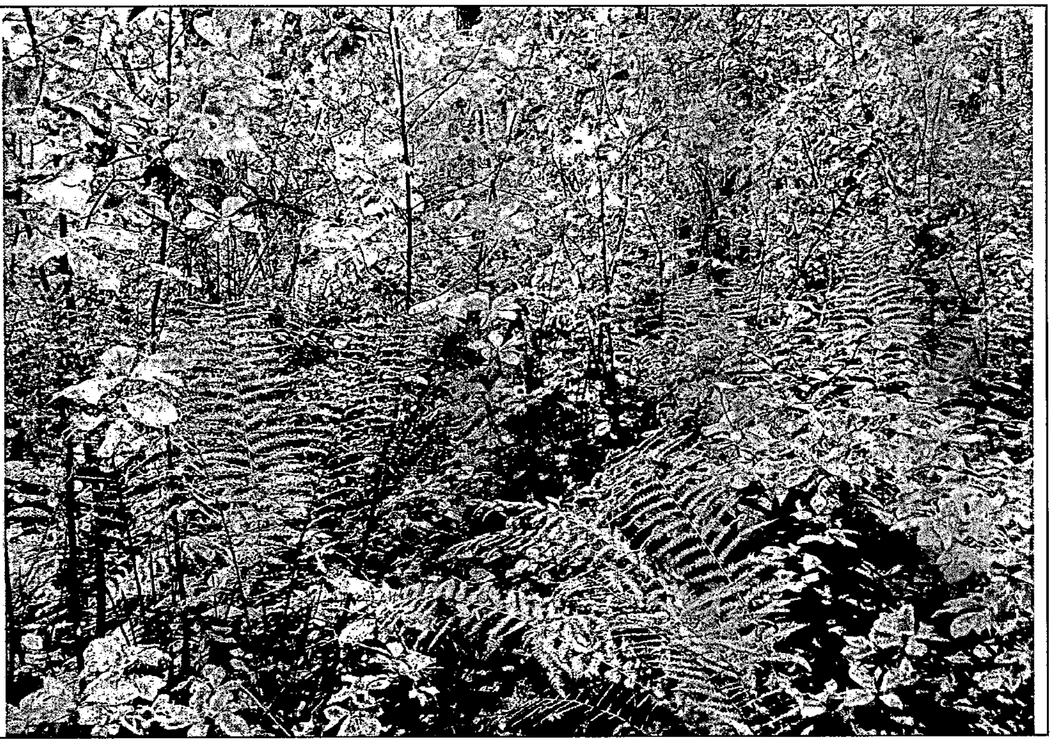


Photo No. 54	**Date:** 10/14/15
Direction Photo Taken: South	
Description: View of 1A55 within WA1	



PHOTOGRAPHIC LOG

Client Name:	**Site Location:** Tewksbury, MA	**Project No.** 12650.00

Photo No. 55	**Date:** 10/14/15

Direction Photo Taken:
northwest

Description:
View of IA57 within WA1

Photo No. 56	**Date:** //

Direction Photo Taken:

Description:

Appendix F:
References

References

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Attachment E

Merrimack Valley Reliability Project

Tewksbury, Andover, Dracut, Massachusetts

Draft Turtle Protection Plan

Turtle Protection Plan

Note: To protect the integrity of the turtle listed as a Species of Special Concern the habitat location and turtle species is not identified.

Introduction

The following turtle protection plan is designed to prevent to the extent possible direct mortality to the subject turtle caused by project construction activities on portions of New England Power Company's (NEP), Merrimack Valley Reliability Project (MVRP) ROW located in Dracut, Massachusetts north of Methuen Street. It is presumed that subject subject turtles are active between April 1 and November 1, however yearly variation in movements may occur based on variability of climatic conditions. Subject turtle has been identified by NHESP as occurring in one location on the ROW. The subject Subject turtle is listed by the Natural Heritage and Endangered Species Program (NHESP) as Species of Special Concern. NEP has previously worked within the ROW and has not encountered subject turtle.

Turtle Mortality Avoidance Plan Components

Contractor Training

Prior to construction activities on the ROW, VHB will coordinate turtle protection measures with NEP and its contractors. As part of this coordination a qualified VHB biologist will train construction personnel in the identification of subject turtle, habitat preferences, behavior, and search methods. Training will also identify measures that must be implemented should turtles be encountered by workers on the ROW during construction activities. All turtles encountered during construction activities will be photographed and reported to NHESP within 10 days of the encounter. VHB will provide 24-hour cell phone contacts to NEP staff and contractor managers with instructions on how to proceed should a turtle be found during Project activities.

Treatment of Active Animals

Prior to daily work activities within priority habitat, the immediate work location and surround area will be intensely searched ('sweep") by a trained individual for subject turtles that may be in the area. Any turtles that are encountered will be displaced greater than 500 horizontal feet from their capture points. While work is occurring, the area surrounding the work location will be monitored periodically to ensure the any turtle(s) that may wander into the area will be located and properly moved from harm.

Treatment of Turtle Nesting

Because portions of the work areas in PH 678/EH 636 will occur in and close to potential nesting habitat extra effort will be taken to prevent direct mortality or disruption of nesting activities. If during construction a female subject turtle is actively nesting she will be avoided and allowed to complete her egg laying activities. Following completion of these actives and after the female has moved away from the location or is able to be moved as described above the nest will be protected by wire mesh and cordoned off with high visibility fencing. If the nest location is in or very close to construction activities NHESP will be contacted to obtain instructions on how to proceed. During the nesting season (June) environmental monitors will be present on the site daily during construction in the area.

Other Protective Measures

To prevent barriers to normal turtle movements, any silt fencing used in work areas located in priority habitat will be removed as soon as site stabilization has occurred. If excavation or trenching is required, excavations, trenches or foundations will be completed and backfilled in one day if possible. If it is not possible to complete an excavation activity within one day, the excavated area will be surrounded by properly installed ("trenched in") silt fence at the end of the work day. This will be done on a daily basis until the excavation is complete and properly backfilled.

Alteration of Protection Plan Elements

The protection plan detailed above is designed to avoid direct mortality to any turtles that are known to use the work area or by chance are found during construction activities. Because work plans may change or weather conditions may necessitate changes in schedules, the avoidance plan offers a certain amount of flexibility to accommodate any such schedule or program change. It is the intention of the avoidance plan to respond to any such change to assure that resident turtles in the planned work area will not be directly harmed by construction equipment or activities. In the event that it is necessary to modify the protective approaches detailed herein, NHESP Staff will be consulted in the development of a modified protective approach.

Data Recording and Reporting

VHB will provide an annual report to NHESP following completion of activities for the year. Should construction continue for more than one year an annual report will be provided to NHESP for each year until the project is complete. The report will include sections on turtle demographics, morphometric data, locational data, movement data and the results of mortality avoidance measures as may be available.

Attachment F

Merrimack Valley Reliability Project

Tewksbury, Andover, Dracut, Massachusetts

National Grid Environmental Guidance Document "EG-303NE" Natural Resource Protection

nationalgrid ENVIRONMENTAL GUIDANCE	**Doc. No.**	**EG-303NE**
	Page 1 of 50	**Rev. 6**
	Date	**09/28/2015**
SUBJECT **Access, Maintenance and Construction Best Management Practices**	**Reference** **EP No. 3 – Natural Resource Protection (Chapter 6)**	

SCOPE: This specification provides Environmental Procedures and Best Management Practices (BMPs) for work on electric and natural gas transmission and distribution rights-of-way (ROWs), fee-owned and easement, cross-country, and public/private roadways, as well as substations, company facilities and on customer-owned projects, and other facilities in New England.

Note that project-specific permits may have other BMPs/constraints that differ from this Environmental Guidance (EG). The projects shall be constructed in accordance with the project-specific permits and this specification. For maintenance work in New Hampshire, there is a state specific BMP manual which supersedes EG-303NE, where applicable[1]. For work in Vermont, there is a state specific BMP manual which may supersede EG-303NE, where applicable[2]. The Massachusetts Runoff, Erosion & Sedimentation Control Field Guide published by the Massachusetts Association of Conservation Commissions (MACC) is incorporated herein as a reference. The MACC Guide is intended as a supplement to EG-303NE and shall be superseded by EG-303NE in the case of an inconsistency or conflict.

PURPOSE: The purpose of this specification is to provide National Grid personnel, consultants and contractors with BMPs to support work that is protective of the environment and that complies with all applicable environmental laws, regulations and company policies and procedures. Environmental policies require the Company to avoid, minimize and mitigate negative impacts to the environment.

POLICY: These BMPs are to be effectively and consistently followed by all personnel accessing Company facilities, ROWs, and customer projects for inspection, maintenance and construction work purposes.

If there are any questions on this guidance, contact the local or project National Grid Environmental Scientist.

These BMPs do not apply to Company employees and contractors performing routine vegetation management activities that are not part of a construction or maintenance project. Employees and contractors maintaining vegetation on Company ROWs and substations shall follow the National Grid Right-of-Way Vegetation Management Plan; Right-of-Way Vegetation Management Specification; Substation, Switch Yard, and Pole Yard Vegetation Management Specification; and Right-of-Way Vegetation Mowing Specification. For more information regarding routine vegetation management, please contact a National Grid Forester.

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[1] The "Best Management Practices Manual For Utility Maintenance In And Adjacent To Wetlands and Waterbodies in New Hampshire"

[2] Vermont DEC, 2006. The Vermont Standards and Specifications for Erosion Prevention and Sediment Control.

APPLICABLE REGULATIONS: Refer to Applicable Regulations in state-specific EG-301 documents.

CONTACTS: If there are any questions on this guidance, contact the National Grid Environmental Scientist.

1.0 Definitions

Refer to **Glossary in Appendix 1** and **Acronyms in Appendix 2**.

2.0 Project Planning

Prior to the start of any project (proposed new facilities or maintenance of existing facilities), the Project Engineer or other project planner shall determine whether any environmental permits or approvals are required, per the state-specific EG-301 environmental checklists. Any questions regarding which activities may be conducted in regulated areas or within environmentally sensitive areas shall be referred to the National Grid Environmental Scientist or Project Environmental Consultant

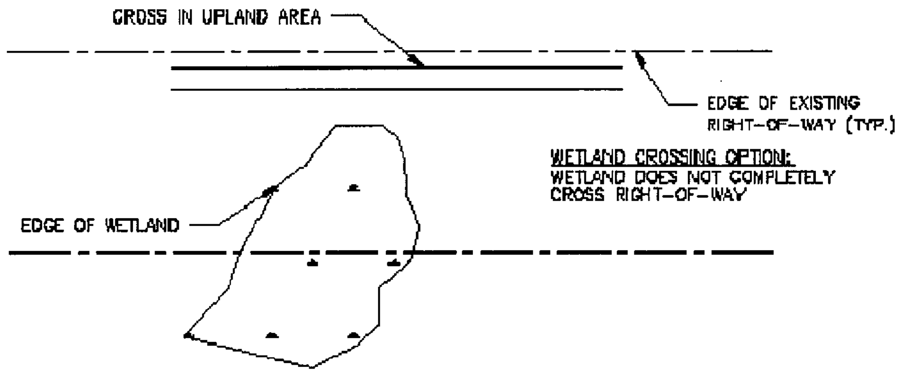
All new construction and maintenance projects shall follow clear and enforceable environmental performance standards, which is the purpose for which these BMPs have been compiled.

2.1 Avoidance and Minimization

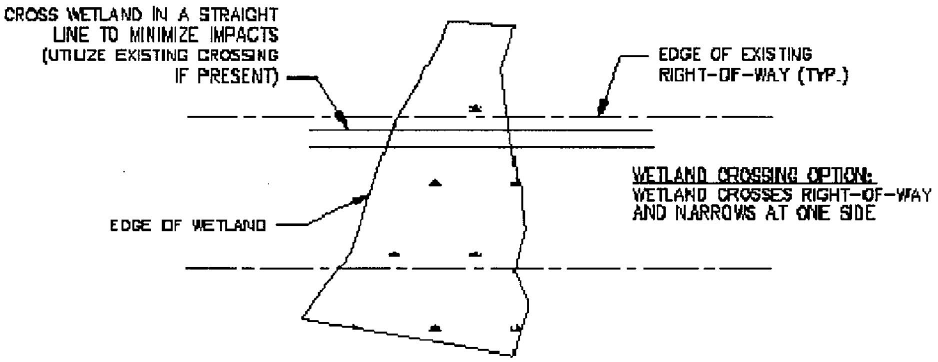
Measures shall always be taken to avoid impacts to wetlands, waterways, rare species habitats, known below and above ground historical/archeological resources and other environmentally sensitive areas. If avoidance is not possible, then measures shall be taken to minimize the extent of impacts. Alternate access routes or staging areas shall always be considered. Below is a list of methods that shall be considered where impacts are unavoidable:

- Use existing ROW access where available. Keep to approved routes and roads without deviating from them or making them wider.
- Off-ROW access shall never be assumed and shall be coordinated through National Grid Real Estate before being implemented.
- Where no existing ROW access is present, avoid wetlands and if a wetland crossing is necessary, cross wetlands at the most narrow point possible or at the location of a previously used crossing (if evident). Figure 1 below illustrates this minimization technique.
- Avoid and minimize stream crossings;
- Minimize the width of typical access roads through wetlands to a maximum width of 16 feet;
- Conduct work manually (without using motorized equipment) in wetlands, wherever possible;

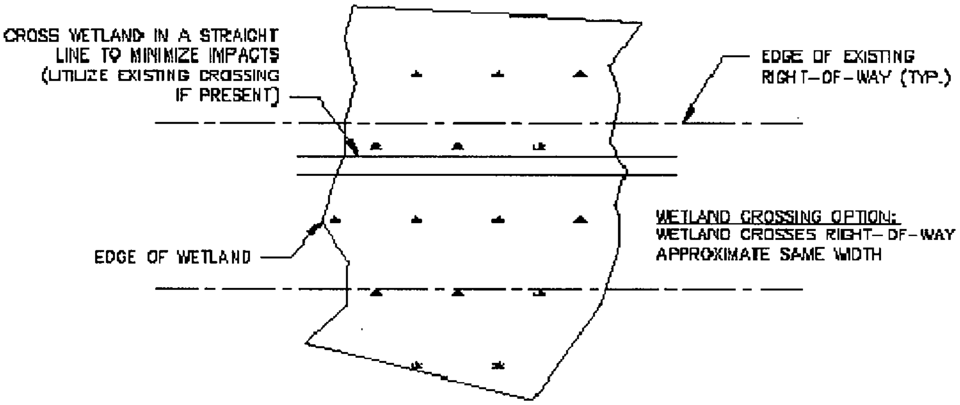
- Use swamp, timber, or similar mats in wetlands to minimize soil disturbance and rutting when crossing or working within wetlands. When not using mats for access, standard vehicles shall not be allowed to drive across wetlands without the prior approval of the National Grid Environmental Scientist. Use of a low ground pressure (LGP) vehicle may be a feasible alternative to mats provided that such LGP vehicle use has been reviewed and approved by the National Grid Environmental Scientist. See Section 8.5.
- Coordinate the timing of work to cause the least impacts during the regulatory low-flow period under normal conditions, when water/ground is frozen, after the spring songbird nesting season, and, outside of the anticipated amphibian migration window (mid-February to mid-June). The United States Army Corps of Engineers (USACE) defines the low-flow period as July 1 through August 30 in MA, July 1 through October 1 in RI, July 1 through October 1 in NH, and July 1 through October 1 in VT.
- Seek alternative routes or work methods to minimize impact.


CROSS IN UPLAND AREA
EDGE OF EXISTING RIGHT-OF-WAY (TYP.)
WETLAND CROSSING OPTION:
WETLAND DOES NOT COMPLETELY CROSS RIGHT-OF-WAY
EDGE OF WETLAND

WETLAND AVOIDANCE
FIGURE 1a – AVOIDANCE


CROSS WETLAND IN A STRAIGHT LINE TO MINIMIZE IMPACTS (UTILIZE EXISTING CROSSING IF PRESENT)
EDGE OF EXISTING RIGHT-OF-WAY (TYP.)
WETLAND CROSSING OPTION:
WETLAND CROSSES RIGHT-OF-WAY AND NARROWS AT ONE SIDE
EDGE OF WETLAND

WETLAND AVOIDANCE
FIGURE 1b – MINIMIZATION
(CROSSING AT NARROWEST LOCATION)


CROSS WETLAND IN A STRAIGHT LINE TO MINIMIZE IMPACTS (UTILIZE EXISTING CROSSING IF PRESENT)
EDGE OF EXISTING RIGHT-OF-WAY (TYP.)
WETLAND CROSSING OPTION:
WETLAND CROSSES RIGHT-OF-WAY APPROXIMATE SAME WIDTH
EDGE OF WETLAND

WETLAND AVOIDANCE
FIGURE 1c – MINIMIZATION
(CROSSING UNIFORM WIDTH IN A STRAIGHT LINE)

2.2 Historically Significant Areas

Areas that have been identified as historically and/or culturally significant shall be avoided in accordance with site-specific avoidance plans, as applicable. Refer to the project-specific Environmental Field Issue (EFI) for any applicable avoidance plans or consult with the National Grid Environmental Scientist. Demarcation of these areas to be avoided shall use staked orange snow fencing or an equivalent physical barrier (not just ribbon flagging) and signage. Refer to Section 16.0 for signage guidance.

2.3 Rare Species Habitat

Work within areas that have been identified as mapped rare species habitat shall follow site-specific requirements, as applicable. In Massachusetts, maintenance activities within mapped habitat (known as Priority Habitat of Rare Species) shall follow the BMPs outlined in the Natural Heritage Endangered Species Program (NHESP)-approved National Grid Operation and Maintenance Plan. Work in mapped rare species habitat may require, at a minimum, turtle training for crews and sweeps of work areas for turtles, botanist identification of rare plant locations and avoidance of these locations, and protection of vernal pools, all prior to the start of work. Demarcation of these areas to be avoided (e.g., rare plant populations, overwintering turtles, nests) shall use staked orange snow fencing or an equivalent physical barrier (not just ribbon flagging) and signage. Refer to Section 16.0 for signage guidance.

Other requirements may apply in NH, VT and RI. Refer to the project-specific EFI for any applicable measures or consult with the National Grid Environmental Scientist.

2.4 Meetings

Pre-permitting meetings shall take place early in the project development process to determine what permits are triggered by the proposed work and the timeline required for permitting. During these meetings, the team shall develop access plans and BMPs to be used during construction of the project.

Field / Constructability review meetings shall take place on-site to evaluate construction site access and job site set-up, to ensure that the project can proceed as permitted. It is at this point in time where work areas, pulling locations, laydown areas, parking areas, and equipment storage areas are evaluated and located. Off-ROW areas under consideration should be included in this discussion.

Prior to submitting permit plans to regulatory authorities, the construction group (contractor or National Grid) shall review the plans for final sign off.

Pre-construction meetings are typically held prior to the commencement of all work to appoint responsible parties, discuss timing of work, and further consider options to avoid and/or minimize impacts to sensitive areas. These meetings can occur on- or off-site and shall include all the willing and available stakeholders (i.e., utility employees, contractors, consultants, inspectors, and/or monitors, and regulatory personnel). Training of crews and supervisors of the EFI, Stormwater Pollution Prevention Plan (SWPPP), rare species, and other permit requirements shall be conducted at a pre-construction meeting.

Pre-job briefings shall be conducted daily or otherwise routinely scheduled meetings shall be conducted on-site with the work crew throughout the duration of the work. These meetings are a way of keeping everyone up to date, confirming there is consensus on work methods and responsibilities, and ensuring that tasks are being fulfilled with as little impact to the environment as possible.

The Project Environmental Scientist/Monitor and Construction Project Manager shall communicate regularly (e.g. weekly or bi-weekly meetings or phone conversations) to discuss the work completed since last communication (i.e. work locations, wetland impacts, equipment used, and unexpected delays or work conditions). These meetings or calls shall include the expected schedule of construction for the upcoming week, the long term construction plans, and planned methods for working near/in wetlands. Both the Project Environmental Scientist/Monitor and Construction Project Manager shall work together so the Project complies with all environmental permits and regulations. When changes to the Project scope or agreed work plan are proposed they shall be done so with the final approval of the National Grid Environmental Scientist.

2.5 Communication of Project Specific Environmental Requirements

Project specific requirements shall be communicated to the project manager/construction manager/engineering group using the following guidelines:

Environmental Field Issue – The EFI will be a full document consisting of narrative, project permits, access and matting plans. A table summarizing pertinent (but not all) permit conditions and the responsible party for those conditions shall be included in the EFI. Copies of all permits should be included as attachments. This will be prepared for most projects with multiple permits or large, complex projects (siting board, Section 404, 401 WQC, SWPPP). There should be EFI training at the pre-construction meeting. Appendix 3 is a sample EFI template

Simplified Environmental Field Issue – the simplified EFI is a memorandum containing project permit(s), access and matting plans and a table summarizing relevant permit conditions and responsible party for those conditions. Copies of all permits should be included as attachments. This will be prepared for most projects with 2 or more permits (Order of Conditions, S404 Cat 1). Appendix 4 is a sample simplified EFI template.

E-mail delivery of Permit and any Sediment/Erosion control or BMP plan – For those projects with only one permit (eg., MA Order of Conditions, RI DEM permit, RI CRMC permit, NH Utility Notification) or projects with a sediment & erosion control plan (local town requirement or for exempt maintenance work), a copy of the permit and any applicable plan will be emailed to the PM (and the project team where deemed necessary) to be incorporated into the Construction Field Issue.

STORMS work management system input – for STORMS work, no EFI is prepared unless multiple permits are required for the project (see guidance above). If only a MA Order of Conditions, MA Determination of Applicability, RI DEM permit, RI CRMC permit, RI SESC Approval, or NH Utility Notification is required, then the permit is attached in Documents tab and conditions noted in Remarks/comments section. Appendix 5 contains standard STORMS boilerplate language.

2.6 Timing of Work

Regulatory authorities may place seasonal or time-of-year restrictions on project construction elements. These time-of-year restrictions may be state or permit-specific, and shall be adhered to.

Work during frozen conditions. Activities conducted once wetland areas are frozen sufficient to minimize rutting and other impacts to the surrounding environment may be authorized by the National Grid Environmental Scientist. Work during this time also generally reduces disturbance of aquatic and terrestrial wildlife movement by avoiding sensitive breeding and nesting seasons. When not using mats for access, vehicles shall not be allowed to drive across wetlands without the prior approval of the National Grid Environmental Scientist.

Work during the regulatory low-flow period. Conducting work during the low-flow period can reduce impacts to surface water and generally avoids spawning and breeding seasons of aquatic organisms. If the water is above normal seasonal levels, adjustments to work activities and methods are required.

2.7 Alternate Access

2.7.1 Manual Access

In some cases such as for smaller projects, work areas can be accessed manually. This includes access on foot through upland and shallow wetland areas, access by boat through open water or ponded areas, and climbing of structures where possible. Smaller projects, such as repair of individual structures, or parts of structures, that do not categorically require the use of heavy machinery, shall be accessed manually to the greatest extent practicable.

2.7.2 Use of Overhead/Aerial Access

Using helicopters can be expensive and is not always feasible, but it may be appropriate in some situations in order to get workers and equipment to a site that otherwise may be very difficult to access. The use of overhead and/or aerial equipment may be beneficial for work in areas where larger water bodies, deep crevices, or mountainous areas hinder ground access. The landing area for helicopters shall be reviewed for environmentally sensitive resources. Use of helicopters requires Project Manager and Senior Management approval.

3.0 Inspection, Monitoring and Maintenance

All construction practices and controls shall be inspected on a regular basis and in accordance with all applicable permits and local, state, and federal regulations to avoid and correct ANY damage to sensitive areas.

The construction crews shall be responsible for completing daily inspections, and IMMEDIATELY bring any **damage or observed erosion, or failed erosion controls** to the attention of the Person-In-Charge and the National Grid Environmental Scientist. Where applicable and/or as directed by environmental permits issued for the project, the Project Environmental Consultant shall conduct weekly (at a minimum) inspections of the project work areas and shall document their inspection using the Stormwater, Wetlands & Priority Habitat Environmental Compliance Site Inspection / Monitoring Report form found in Appendix 6 and issue the report within 24 hours. The Person-in-Charge shall work with the National Grid Environmental Scientist and the Project Environmental Consultant to determine when and how the repairs shall be made.

Project-specific Action Logs and Long-Term Restoration Logs are prepared as needed by the National Grid Environmental Scientist or the Project Environmental Consultant to track issues and/or repairs and assign responsible parties.

4.0 Best Management Practices

The BMP sections presented in this EG address access, construction, snow and ice management, structures in wetlands, access road maintenance and repair, clean-up and restoration standards, ROW gates, field refueling and maintenance operations, management of spills/releases, and a summary of key construction BMPs.

Note that BMPs shown on any permit drawings for a specific project may need to be revised and or supplemented during the execution of a project based on unforeseen or unexpected factors such as extreme weather or unknown subsurface conditions. It is the responsibility of the Contractor to work with the National Grid Environmental Scientist and/or the Project Environmental Consultant to identify necessary changes and to ensure that construction-related impacts to wetlands, waterbodies and other environmentally sensitive areas are avoided.

Any deviation from the approved Best Management Practices shown in the EFI and/or SWPPP plans shall be communicated immediately to the National Grid Environmental Scientist as it may require additional permitting or could result in a permit violation.

4.1 Wetland Boundary Demarcation

Prior to the start of any activity conducted under an environmental permit, wetland boundaries shall be reviewed. Flagging for wetland boundaries, stream banks and other resource areas shall be refreshed as needed. This may become particularly important when the original flagging was placed in previous seasons and now may have become obscured.

4.2 Sedimentation and Erosion Controls

Appropriate sedimentation and erosion control devices shall be installed at work sites, in accordance with permit conditions and/or regulatory approvals, and as needed to prevent adverse impacts to water resources and adjacent properties.

The overall purpose of such controls is to prevent and control the movement of disturbed soil and sediment from work sites to adjacent, undisturbed areas, and particularly to water resources, public roads and adjacent properties. All proprietary controls shall be installed per manufacturer's recommendations and specifications.

Appropriate sedimentation and erosion control devices include but are not limited to: silt fencing, straw bales, wood chip bags, straw wattles, compost socks, erosion control blankets, mulch, slope interruption practices, flocculent powder/blocks and storm drain/catch basin inlet protection. Such controls shall be installed between the work area and environmentally sensitive areas such as wetlands, streams, drainage courses, roads and adjacent property when work activities shall disturb soils and result in a potential for causing sedimentation and erosion.

Staked straw bales often serve as the demarcation of the limits of work and/or sensitive areas to be avoided. Work shall never be conducted outside the limit of erosion controls without prior approval from the National Grid Environmental Scientist.

Project plans depict proposed erosion controls, however field conditions may warrant additional practices be implemented (e.g., wet conditions, frozen conditions, poorly drained soils, steep slopes, materials used for work pads, transition areas to swamp mats, number of trips across work areas, etc.).

Any deviation from the approved erosion controls shown in the EFI and/or SWPPP plans needs to be communicated immediately to the National Grid Environmental Scientist as it may require additional permitting or result in a permit violation.

Appendix 7 provides typical sketches of common sedimentation and erosion controls. If a SWPPP is required for the project, maintenance and inspection of erosion controls shall follow the SWPPP requirements. Sedimentation and erosion controls shall be properly maintained and inspected on a periodic basis, until work sites are properly stabilized and restored. Inspections shall be documented using the Inspection Form "Storm Water, Wetlands & Priority Habitat Environmental Compliance Site Inspection/Monitoring Report" (**Appendix 6**).

The sequence and timing of the installation of sedimentation and erosion control measures is critical to their success. Sedimentation and erosion controls shall be installed prior to commencing construction activities that may result in any soil disturbance or cause otherwise polluted site runoff. Inspection of these devices may be required by the National Grid Environmental Scientist or by regulators prior to the start of work. The installation of water bars and other erosion control measures shall be installed shortly thereafter.

4.3 Concrete Wash Outs

Concrete wash outs shall be used for management of concrete waste. Concrete and concrete washout water shall not be deposited or discharged directly on the ground, in wetlands or waterbodies, or in catch basins or other drainage structures. Where possible, concrete washouts shall be located away from wetlands or other sensitive areas. Consult the National Grid Environmental Scientist on proposed concrete wash out locations prior to their use. Following the completion of concrete pouring operations, the wash outs shall be disposed of off-site with other construction debris. Refer to BMPs in Appendix 7.

4.4 Construction Activities in Standing Water

The use of silt curtains or turbidity barriers may be required when working in or adjacent to standing water such as ponds, reservoirs, low flowing rivers/streams, or coastal areas. Silt curtains and turbidity barriers prevent sediment from migrating beyond the immediate work area into the resource areas.

Coffer dams constructed using sheet piling or large sandbags (Trade names such as "the Big Bag" or "DamItDams") may be used to temporarily isolate and contain a work area in standing water.

When working in standing water, an oil absorbent boom, in addition to a silt curtain or other temporary barrier, shall be placed around the work area for spill prevention.

Work in drinking water reservoirs or other waters may require extensive regulatory agency review, even for maintenance work, which could result in additional time required for permitting, review and material procurement prior to the start of work.

4.5 Dewatering

Where excavations require the need for dewatering of groundwater or accumulated stormwater, the water shall be treated before discharge. Appropriate controls include dewatering basins, flocculent blocks, filter bags, filter socks, or weir tanks. Schematics of these BMPs are included as in Appendix 7. Water trucks or fractionation tanks may be utilized if watertight containers are desired for controlled on-site discharge or for off-site discharge into an approved dewatering area when site restrictions make it difficult to utilize other dewatering methods on-site. Dewatering discharge water shall never be directed into wetlands, streams/rivers, other sensitive resource areas, catch basins, other stormwater devices, or substation Trenwa trenches. Dewatering flow shall be controlled so that it does not cause scouring or erosion through the use of a dewatering basin, filter sock, or equivalent. If it is determined that the chosen controls are not appropriately filtering the fine sediment from the dewatering pumpate then the National Grid Environmental Scientist shall be notified immediately and the controls shall be revised or supplemented.

When establishing a dewatering basin, consideration should be given to the anticipated volume of water and rate of pumping in determining the size of the dewatering basin. Dewatering basins shall be constructed on level ground. Once pumping commences, the basin shall be monitored frequently to assure that the rate of water delivery to the structure is low enough to prevent water from flowing, unfiltered, over the top of the basin walls. The basin shall be monitored throughout the dewatering process because the rate of filtration shall decrease as sediment clogs the filter fabric. If the basin is not appropriately filtering the fine sediment from the dewatering pumpate then the basin may need to be supplemented with a flocculent block. Field conditions shall dictate how often the basin should be inspected.

Distance to sensitive areas, direction of flow (toward or away from protected, or sensitive areas, such as wetlands, ponds, or streams), amount of vegetative ground cover between the basin and nearby sensitive areas, ground conditions (ledge, frozen, etc.), volume of water being pumped, and pump-rate, are some of the factors to be considered when determining an inspection frequency. Clogged filter fabric shall be replaced and accumulated sediment shall be removed as necessary from the basins to maintain efficacy.

Unattended dewatering shall never be allowed. If 24-hour dewatering is required for on-site construction activities, a designated attendee shall be trained by the National Grid Environmental Scientist.

Basins shall be cleaned and removed as soon as dewatering is complete. Sediment removed from the dewatering basin shall be allowed to dry before being disposed of by evenly spreading it over unvegetated upland areas where erosion is not a concern if clean or removing it from the site for proper disposal. Off-site trucking of wet soils is prohibited. The sediment disposal area shall be approved by the National Grid Environmental Scientist or the Project Environmental Consultant prior to use. Stabilization measures shall also need to implemented and approved by the National Grid Environmental Scientist or the Project Environmental Consultant. Soils/sediments shall be dewatered or mixed with dry material such that they are appropriate for off-site transport.

Any new dewatering location (not previously reviewed and approved by the National Grid Environmental Scientist during project planning or permitting) shall be reviewed and the discharge location approved by the National Grid Environmental Scientist before use.

Complex projects that require large scale dewatering shall require individual review by the National Grid Environmental Scientist and may trigger additional permitting.

Dewatering in areas of known chemical contamination may require a separate NPDES permit, or other approval, and treatment or containment system. Consult with the National Grid Environmental Scientist.

4.6 Check Dams

Check dams are a porous physical barrier installed perpendicular to concentrated storm water flow. They are used to reduce erosion in a swale by reducing runoff energy (velocity), while filtering storm water, thereby aiding in the removal of suspended solids.

Check dams should only be used in small drainage swales that shall not be overtopped by flow once the dams are constructed. These dams should not be placed in streams. Check dams are typically installed in ROWs or on other construction sites prior to the start of soil disturbing work. Per the Rhode Island Soil Erosion and Sediment Control Handbook, no formal design is required for a check dam if the contributing drainage area is 2 acres or less and its intended use is shorter than 6 months; however, the following criteria should be adhered to when specifying check dams.

- The drainage area of the ditch or swale being protected should not exceed 10 acres.
- The maximum height of the check dam should be 2 feet.
- The center of the check dam must be at least 6 inches lower than the outer edges.
- The maximum spacing between the dams should be such that the toe at the upstream dam is at the same elevation as the top of the downstream dam.

Per the NHDES stormwater manual, the use of check dams should be limited to swales with longitudinal slopes that range between 2 to 5 percent that convey drainage from an area less than 1 acre. Existing conditions that exceed these limitations should be assessed in the field and discussed with the National Grid Environmental Scientist to determine the viability of this BMP for the specific application. Check dams are often comprised of stone, straw bales, sand bags, or compost/silt socks. Use of check dams should be coordinated with the National Grid Environmental Scientist to ensure that the material selection, spacing and construction method are appropriate for the site. Check dams composed of biodegradable materials (e.g. straw bales or wattles, wood chip bags) may require periodic replacement for continued proper functioning[3]. Refer to BMPs in Appendix 7.

4.7 Water Bars

Water bars should be used on sloping ROWs to divert storm water runoff from unstabilized or active access roads when needed to prevent erosion. Surface disturbance and tire compaction

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[3] Grass growth on a biodegradable type check dam is evidence that the material is decomposing. While this doesn't mean it is no longer functioning, it means it may be in a weakened condition and could potentially fail under high flow velocity. It is acceptable for grass to be growing on a stone check dam.

promote gully formation by increasing the concentration and velocity of runoff. Water bars are constructed by forming a ridge or ridge and channel diagonally across the sloping ROW. Each outlet should be stable. The height and side slopes of the ridge and channel are designed to divert water and to allow vehicles to cross. When siting water bars, consideration shall be given to the sensitivity of the area receiving the diverted runoff. For example, runoff should not be directed into a wetland, waterbody, other environmentally sensitive areas, or to private property or public roadways. Refer to BMPs in Appendix 7.

4.8 Retaining Walls

In some situations, retaining walls comprised of concrete blocks, gabions, boulders or other comparable materials may be required to stabilize the shoulder of existing access roads and/or supplement required erosion controls. Installation of such measures shall not be allowed as a maintenance activity. Should these controls be considered for a project, it shall be reviewed by the National Grid Environmental Scientist, as design and additional permitting may be required.

4.9 Slope Stabilization

Temporary slope stabilization practices help to keep exposed, erodible soils stabilized while vegetation is becoming established. Acceptable temporary slope stabilization practices may include the use of erosion control blankets, or hydraulic erosion control. Erosion control blankets, often comprised of natural fibers (e.g., jute, straw, coconut, or other degradable materials) are a useful slope stabilization, erosion control and vegetation establishment practice for ditches or steep slopes. Blankets are typically installed after final grading and seeding for temporary or permanent seeding applications. Hydraulic erosion control practices, including Bonded Fiber Matrix or hydroseed with a soil stabilizer (e.g., tackifier and/or mulch) may be an acceptable or desirable alternative form of temporary slope stabilization. For all practices, manufacturer's specifications should be followed for installation depending on slope and other field conditions. Consult the National Grid Environmental Scientist prior to selecting and installing any slope stabilization practices. Refer to BMPs in Appendix 7.

4.10 Maintenance of Sedimentation and Erosion Controls

Sedimentation and erosion controls shall be maintained in good operational condition during the course of the work. This includes , but is not limited to, replacing straw bales that are no longer in good condition, re-staking straw bales, replacing or re-staking silt fence, and removing accumulated sediment. Remove sediment before it has accumulated to one half the height of any exposed silt fence fabric, straw bales, other filter berm, check dams or water bars. Accumulated sediment shall be removed from sedimentation basins to maintain their efficacy. Manage the removed sediment by evenly spreading it over unvegetated upland areas where erosion is not a concern, by stockpiling and stabilizing, or by disposing of off-site. Stabilization measures shall also need to be implemented and approved by the National Grid Environmental Scientist or the Project Environmental Consultant. Where a SWPPP has been prepared for a specific site, the guidelines documented therein shall govern the management of sediment.

5.0 Right-of-Way (ROW) Access

Whenever possible, access shall be gained along existing access routes or roads within the ROW. However, in some cases there is no existing access. In many cases, temporary access can be utilized. The following practices provide general guidance on accessing a ROW. Check with a National Grid Environmental Scientist to determine if any environmental permitting is required before utilizing a temporary access.

National Grid operates substations and has cross-country ROW with overhead electric power lines in four New England States. MA, NH and RI also have transmission and distribution natural gas pipelines. Access is needed to substations, ROWs, and customer property, for inspection, maintenance and construction activities. Many projects are located in or near environmentally sensitive areas, such as rivers/streams, wetlands, floodplains, or rare species habitat, etc., which are protected from activities that may disturb these resources.

Note that the building of new roads or enlargement of existing roads is **prohibited** unless this activity is allowed by a project-specific permit, and the new roads appear on the Site Plans that were authorized in the regulatory approvals.

5.1 Off-ROW Access

Off-ROW access shall be evaluated for wetlands, rare species, cultural resources and other potential sensitive receptors, as applicable. National Grid Real Estate and Stakeholder Relations shall also be contacted as soon as possible once off-ROW access is determined to be needed.

5.2 Stabilized Construction Entrance/Exit for Access to ROWs from Public or Private Roads

A suitable (minimum 15-foot wide by 50-foot long) construction entrance/exit shall be installed at the intersection of the ROW access road/route with public/private paved roads, or other such locations where equipment could track mud or soil onto paved roads. The construction entrance/exit should be comprised of clean stone installed over a geotextile fabric. Geotextile fabric may be omitted for permanent construction entrances/exits on a case-by-case basis with the approval of the National Grid Environmental Scientist. Refer to BMPs in Appendix 7.

Construction entrance areas shall be monitored and maintained to ensure that stone or other material is not deposited onto the roadway, causing a safety concern. Where track-out of sediment has occurred onto a roadway, it shall be swept off the road by the end of that same work day.

If a construction entrance/exit is clogged with sediment and no longer functions, the sediment and stone may require removal and replacement with additional clean stone (clean stone refreshment) to ensure this tracking pad is performing its intended function adequately. Heavier traffic use may require this clean stone refreshment multiple times throughout a project. Reinforcement of these stabilized construction entrance/exits with asphalt binder or asphalt millings is not likely to be considered "maintenance" and may trigger additional permitting requirements[4]. In some cases, heavily used construction entrances/exits may benefit from the installation of a 5-15 foot strip of asphalt binder or asphalt millings closest to the paved roadway to capture any stone that is tracked from the stone apron. Such cases shall be evaluated on an individual basis with the National Grid Environmental Scientist.

Once work is complete, the construction entrance/exit shall either be removed or retained, depending upon future maintenance-related access needs, property ownership, and/or project-specific approvals. If removed, the area shall be graded, seeded (if adequate root and seed stock are absent) and mulched. Proper approvals for leaving access roads in place shall be obtained; contact the National Grid Environmental Scientist and Property Legal.

5.3 Maintenance of Existing Access Roads

In many cases, the existing access road may need to be maintained to allow passage of the heavy equipment required for scheduled maintenance work. Access roads cannot deviate from the approved and permitted access plans. Maintenance of these roads may include adding clean gravel or clean crushed stone to fill depressions and eroded areas. This activity shall be conducted only within the width of the existing access road footprint and does not include widening existing access roads

If gravel begins to migrate onto the existing vegetated road shoulder, this gravel shall be removed during the project and/or after the completion of use of the road to ensure the road fill is not spreading into adjacent resource areas, or resulting in the road becoming much wider than its pre-existing or permitted condition. In some areas of mapped rare species habitat or other sensitive areas where project-specific permit conditions require the prevention of the migration of sediments into adjacent resources, an engineered stabilization system (e.g., GeoWeb or similar) may be suitable to prevent sedimentation while allowing for unrestricted wildlife migration.

Major reconstruction projects may require multiple permits. In all cases, the fill to be used for existing access roads shall be clean and free of construction debris, trash or woody debris. Use of processed gravel may be approved by the Person-In-Charge or the National Grid Environmental Scientist, on a case-by-case basis. If clean stone is used then addition of more erosion controls may not be necessary.

5.4 Maintenance of Existing Access Routes (Cross Country Routes)

Ruts and depressions along existing access routes and within the existing ROW may only be leveled and graded. Addition of fill or stone may require permitting as well as additional erosion controls, and needs to be approved by the National Grid Environmental Scientist

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[4] Depending on the road, use of an asphalt binder or asphalt millings as a construction entrance/exit may trigger state or local permit requirements.

5.5 Maintenance of Existing Culverts

Damaged culverts may not be repaired or replaced without consulting with the National Grid Environmental Scientist to determine if a permit is required. For functioning culverts, care shall be taken to protect adjacent wetlands and watercourses by installing appropriate sedimentation and erosion controls around the downstream end of the culvert. Culverts shall be repaired/replaced in kind and shall not be changed in size unless approval has been obtained from the National Grid Environmental Scientist. In-kind replacement is replacement using the same material, functional inverts, diameter and length as the existing culvert. Changes to any of these characteristics shall require permitting. Installation of any **new** culvert is not allowed without obtaining all necessary permits first. Refer to BMPs in Appendix 7.

If, at the time of anticipated replacement, there is heavy flow through the culvert, the Person-In-Charge shall consult with the National Grid Environmental Scientist, to verify whether the culvert shall be replaced at that time. Water may need to be temporarily diverted during culvert repair/replacement. There typically are seasonal restrictions limiting both the replacement of existing culverts as well as installation of new culverts to the low-flow period. The low-flow period can vary from state to state. If any unexpected conditions are encountered during culvert replacement, the National Grid Environmental Scientist shall be contacted immediately prior to the work being completed for additional consultation.

5.6 Temporary Construction Access over Drainage Ditch or Swale

In some situations, construction access from paved roads onto ROWs may require the crossing of drainage ditches or swales along the road shoulder. In these situations, the installation of swamp mats, mat bridges or temporary culverts may facilitate construction access over the ditches or swales. These culverts shall be temporary only, sized for peak flow, and shall be removed after construction is complete. Consult with the National Grid Environmental Scientist prior to installation. In addition, if access over existing culverts may require extending the culvert, consult with the National Grid Environmental Scientist. Refer to BMPs in Appendix 7.

5.7 Construction Material along ROW

After preparing a site by clearing and/or installing any necessary erosion and sediment controls and prior to the start of construction, material such as poles, cross-arms, cable, insulators, stone and other engineered backfill materials may be placed along the ROW, as part of the project. The stockpiling of stone and other unconsolidated material on swamp mats shall be avoided, if determined necessary due to access and workpad constraints, the material must be placed on a geotextile fabric and be properly contained with a sedimentation barrier such as straw wattle. No construction material shall be placed in wetlands or other sensitive resource areas unless authorized by the National Grid Environmental Scientist or Project Environmental Consultant

6.0 Winter Conditions

6.1 Snow Management

DO NOT stockpile or dispose of snow in any water body, including wetlands, rivers/streams, the ocean, reservoirs, ponds, or stormwater catch basins. A buffer of at least 25 feet shall be maintained between any snow disposal area and any the high water mark of any surface water. A silt fence or equivalent barrier shall be securely placed between the snow storage area and the high water mark of rivers, streams, ponds, or the ocean. In addition to water quality impacts and flooding, snow disposed in surface water can cause navigational hazards when it freezes into ice blocks. Some state and local authorities have specific snow management requirements. Consult with the National Grid Environmental Scientist on specific restrictions.

DO NOT deposit snow within a wellhead protection area (e.g., a Zone II), in a high or medium-yield aquifer, or within 200 feet of a private well, where road salt may contaminate water supplies. **Consult with the National Grid Environmental Scientist to determine if a proposed disposal area is located within one of these sensitive areas.**

Avoid disposing of snow on top of storm drain catch basins or in storm water drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water and could also result in fines or a violation being assessed against National Grid.

All debris in a snow storage area shall be cleared from the site and properly disposed of no later than May 15 of each year.

Care shall be taken not to plow road materials away when removing snow.

6.2 De-Icing

Where allowed, calcium chloride is preferred as a de-icing agent when applied according to manufacturer's guidelines in upland areas. Sand shall be used on swamp mats through wetland areas.

Consult with the National Grid Environmental Scientist on de-icing agents when working in a facility or substation close to resource areas. Many municipalities have specific requirements for de-icing agents allowed within 100 feet of wetland resources and other sensitive areas.

6.3 Snow and Ice Management on Swamp Mats

Proper snow removal on swamp mats shall avoid the formation of ice. To avoid the formation of ice, snow shall be removed from swamp mats before applying sand. Prior to their removal from wetlands, sand shall be collected from the swamp mats and disposed of in an upland area. A round street sweeping brush mounted on the front of a truck may be an effective way to remove snow from swamp mats. Propane heaters may also be suitable solutions for snow removal and/or de-icing of swamp mats.

Once swamp mats are removed, wetlands shall be inspected for build up of sand that may have fallen through swamp mats. Care shall be taken to inspect wetland crossings as each mat is removed to ensure sand is properly removed and disposed of off-site.

7.0 Swamp Mats

The use of swamp mats allows for heavy equipment access within wetland areas. The use of swamp mats minimizes the need to remove vegetation beneath the access way and helps to reduce the degree of soil disturbance and rutting in soft wetland soils. Swamp mats most often used by National Grid are wooden timbers bolted together typically into 4-ft by 16-ft sections, wooden lattice mats, or composite mats. In some cases, swamp mats or other mats are used for staging or access in upland areas based on site conditions (e.g., agricultural field access). Refer to BMPs in Appendix 7.

Typically swamp mats may be installed on top of the existing vegetation, however in some instances cutting large woody vegetation may be required. Check with National Grid Environmental Scientist prior to cutting or clearing vegetation for swamp mat placement.

Follow the approved plans in the EFI for swamp mat installation and do not deviate from the plans. **Any deviation from the approved plans needs to be communicated immediately to the National Grid Environmental Scientist as it may require additional permitting, require stopping the project or result in a permit violation or revocation.**

7.1 Swamp Mats and Mowing

Close coordination with the mowing contractor shall be required to ensure that access plans are followed, and swamp mats are utilized when necessary. Sometimes mowing contractors may have to work off the leading edge of a swamp mat to mow in order to lay the next swamp mat and continue further into the wetland. Under no circumstances shall trees or shrubs be allowed to be pulled out of the wetland by the root ball. The root ball of trees and shrubs shall remain intact. Chipping debris and excessive amounts of slash shall not be placed in wetlands or other resource areas. In some instances, it may be beneficial to pile a reasonable amount of slash within a nearby upland area to create habitat for wildlife. This activity shall be approved by the National Grid Environmental Scientist.

7.2 Stream Crossings and Stream Bank Stabilization

Stream crossings shall be bridged with swamp mats or other temporary minimally-intrusive measures unless fording is acceptable for the site and is authorized by the National Grid Environmental Scientist. Care shall be taken when installing a swamp mat bridge to insure that the stream bed and banks are not damaged during installation and removal and that stream flow is not unduly restricted. An environmental permit may be required to cross or disturb protected waters, depending upon state-specific regulatory requirements. Refer to BMPs in Appendix 7. Immediately following swamp mat removal, all stream banks shall be stabilized and restored to prevent sedimentation and erosion.

7.3 Cleaning of Swamp Mats

Mats shall be certified clean by the vendor prior to installation. The vendor shall use the certification form provided as Appendix 8 to document compliance. Clean is defined as being free of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials prior to being brought to the project site. Any equipment or timber mats that have been placed or used within areas containing invasive species within the project site shall be cleaned of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials at the site of the invasive species prior to being moved to other areas on the project site to prevent the spread of invasive species from one area to another[5]. **Mats shall be cleaned prior to being removed at the completion of the project: exceptions to this requirement may be made on a case-by-case basis.** Consult with the National Grid Environmental Scientist prior to discharging or disposing of any waste water or waste material from the cleaning of swamp mats.

7.4 Stone Removal for Swamp Mat Placement

For situations where the matting contractor determines that stones or boulders must be removed or relocated within wetland areas in order to install safe and level structure work pads or access roads the boulders shall be moved in a manner which does not result in significant soil disturbance (i.e., pushing with a bull dozer is not allowed). The boulders shall not be placed on any existing vegetated areas within wetlands or within vernal pools. When numerous boulders shall be removed from a wetland area, they shall be deposited in an upland area outside of the flagged wetland limits, outside of any cultural resource areas and outside of any RTE species populations. Any boulders that shall be placed within buffers (In MA, the 100-foot buffer zone, and in RI, the 50-foot Perimeter Wetland, 100-foot or 200-foot Riverbank Wetlands) shall be placed to avoid causing soil disturbance and they shall be within an approved limit of work. When there is a significant number of boulders that shall be removed, the National Grid Environmental Scientist shall be consulted for guidance.

7.5 Transition onto Mats

Erosion controls and stone or wood chip ramps shall be installed to promote a smooth transition to and minimize sediment tracking onto swamp mats. Geotextile may be added beneath stone or wood chip transitions to facilitate removal, as necessitated by site or permit conditions. Mat transitions shall be removed once swamp mats have been removed and during restoration. Refer to BMPs in Appendix 7.

7.6 Corduroy Roads

Corduroy roads are a wetland crossing method where logs are cut from the immediate area and used as a road bed to prevent rutting from equipment crossing. This technique is designed to be used in areas of wetland crossings where there is no defined channel or stream flow and should never be used in streams. Corduroy logs shall be placed in the narrowest area practicable for crossing with the logs placed perpendicular to the direction of travel across wet area. The use

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[5] On ROW projects where multiple wetlands may be dominated by the same invasive species, cleaning may not be required for movement along the ROW. Check with the National Grid Environmental scientist for guidance.

of corduroy logs shall only be in emergencies when approved by the National Grid Environmental Scientist or when they have been specifically permitted as part of a project. Refer to BMPs in Appendix 7.

7.7 Swamp Mat Removal

Once swamp mats are removed, wetlands shall be inspected for build up of sand or other materials that may have fallen through swamp mats. Care shall be taken to inspect wetland crossings as each mat is removed to ensure any materials are properly removed and disposed of off-site.

7.8 Bridging over other utility facilities

In ROWs where other utility facilities (including but not limited to gas, oil, fiber optic, electric, water, and sewer) are co-located within the transmission ROW, bridging may be required to cross those facilities. The project team shall coordinate with the respective utility company prior to determining if bridging or permanent crossings are required.

8.0 LGP Equipment Use

Only when approved by the National Grid Environmental Scientist on a case-by-case basis shall equipment with LGP of **less than 3 psi when loaded** be allowed to access through wetlands. The National Grid Environmental Scientist's approval of the use of LGP equipment through wetlands depends on several criteria including:

- Time of year. LGP equipment use may be allowed if weather and field conditions at the time of construction are suitable to eliminate/minimize the concern of rutting or other impacts. Frozen, frozen snow pack, low flow, or drought conditions are typically acceptable conditions. Spring and fall construction, due to the typical higher precipitation, are not suitable times of year for LGP equipment use.
- Number of trips. Multiple trips through a wetland have shown to increase the potential for damage and require matting. LGP equipment use shall likely only be approved if trips are limited to one trip in and one trip out.
- Type of wetland system. Some wetlands have harder soils/substrate, and may be passable without causing significant damage. Some of the wetlands along National Grid ROWs have existing hard bottom roads that have been vegetated over time and may be traversed with LGP equipment without swamp mats.
- Emergencies. LGP equipment use may be allowed during emergency or storm conditions for outage restoration.
- State-specific USACE General Permit Performance Standards. The standard is for no impact to the wetland, which may be obtained by using LGP equipment (<3 psi **when loaded**). *"Where construction requires heavy equipment operation in wetlands, the equipment shall either have low ground pressure (<3 psi), or shall not be located directly on wetland soils and vegetation; it shall be placed on swamp mats that are adequate to*

support the equipment in such a way as to minimize disturbance of wetland soil and vegetation."

- Local bylaws. Municipal wetland bylaws, where applicable, shall be reviewed for prohibitive conditions or applicable performance standards.

LGP equipment approval is required **at the time of construction for each wetland crossing** and shall be dependent upon the above conditions. In addition, LGP equipment use and approval shall be assessed by the National Grid Environmental Scientist during construction on a continuing basis; LGP equipment use shall cease immediately if field conditions are found to be unsuitable. ***Please note that if LGP vehicles are used, and wetlands damage occurs, the use of the LGP equipment shall be suspended.***

9.0 Soil Disturbing Activities

9.1 Dust Control

Water or application of calcium chloride or other National Grid approved equivalent in accordance with the manufacturer's guidelines may be used for dust control along ROWs in upland areas. During application of water for dust control, care shall be taken to ensure that water does not create run-off or erosion issues. Refer to BMPs in Appendix 7.

9.2 Clearing

Clearing is not allowed without specific permission as it constitutes soil disturbance under several regulatory programs and may trigger permitting by increasing the project's footprint of disturbance. If clearing is required for a project, the limit of clearing shall be established with flagging or construction fencing and/or erosion controls. Clearing shall be done in accordance with project specific permits. Following the completion of clearing, the limits of work shall be re-established. Refer to BMPs in Appendix 7.

9.3 Grubbing

Grubbing is not allowed without specific permission as it constitutes soil disturbance under several regulatory programs and likely triggers permitting by increasing the project's footprint of disturbance. If grubbing is required for a project, the limit of grubbing shall be re-established after clearing has been completed. The area of grubbing shall be identified with flagging or construction fencing and/or erosion controls. Grubbing shall be conducted in accordance with project-specific permits.

9.4 Blasting

If blasting is anticipated, the project team, including the National Grid Environmental Scientist, shall be consulted.

9.5 Site Grading

The work site shall not be graded other than in accordance with project permits. Any proposed grading shall be reviewed by the National Grid Environmental Scientist for wetlands, rare species habitat, areas of cultural and historical significance, and other environmentally sensitive areas prior to start of work. In some cases, additional testing for cultural or historical resources may be triggered by proposed grading; alternatives to grading may be sought due to protracted time frame of obtaining the permit associated with testing and performing the testing. Grading outside of a regulated area shall be kept to the minimum extent necessary for safe and efficient operations and shall comply with the project permit plans.

Grading shall be performed in a manner which does not increase the erosion potential at the Site (e.g., terraces or slope interruptions shall be utilized). Graded sites shall be promptly stabilized by applying a National Grid approved seed mix (if adequate root and seed stock are absent), and mulching with hay, straw or cellulose (use straw or cellulose hydromulch where the potential introduction of invasive plant species is of concern) to reduce erosion and visual impact, as soon as possible following completion of work at the site. Grading within a regulated area shall be subject to the review and approval of the National Grid Environmental Scientist.

In some municipalities, site grading activities require the prior approval of the Town Engineer, Building and Zoning Official, or Public Works Director. Local ordinances or bylaws should be reviewed for applicable restrictions and permitting thresholds

9.6 Site Staging and Parking

During the project planning and permitting process, locations shall be identified for designated crew parking areas, material storage, and staging areas. Where possible, these areas should be located outside of buffer zones, watershed protection areas, and other environmentally sensitive areas. Any proposed locations shall be evaluated for all sensitive receptors and for new projects requiring permitting, shall be incorporated onto permitting and access plans.

9.7 Soil Stockpiling

Soil stockpiles shall be located in upland areas and, if in close proximity to wetlands and wetland buffers, shall be enclosed by staked straw bales or another erosion control barrier. The stockpiling of stone, drill spoils and other unconsolidated material on swamp mats shall be avoided unless determined necessary due to access and work pad constraints. Additional controls, such as watertight mud boxes and geotextile/filter fabric over or between swamp mats shall be considered for stockpile management. If material is placed on swamp mats and falls through into wetlands, the material must be removed by hand. Saturated soils shall be allowed to dewater prior to off-site transport for sufficient time to ensure that water/sediment is not deposited onto swamp mats or public roads during transport.

9.8 Top Soil/High Organic Content Soil

When the work site requires excavation and grading, the top soil shall be stockpiled separately from the material excavated. This top soil shall be spread as a top dressing over the disturbed area during restoration of the site.

In some instances where work is occurring within wetlands, high organic content soil may be displaced. Such high organic content soil shall be segregated from other excavated materials and stockpiled for use in wetland restoration areas. Care shall be taken to minimize the handling of high organic content soil. Preferably, the soil shall be stockpiled in one location until it is moved to the restoration area.

10.0 Stone Wall Dismantling and Re-building

Removal or alteration of stonewalls shall be avoided, whenever possible. As appropriate, some stonewalls removed or breached by construction activities shall be repaired or rebuilt. Rebuilt stone walls shall be placed on the same alignment that existed prior to temporary removal, to the extent that it shall not interfere with operations. The removal and rebuilding of stone walls requires approval from the National Grid Environmental Scientist and Property Legal, and may require several weeks lead time for coordination. Note that not all states allow this technique. Dismantling may not be allowed at all due to quality or significance of the wall. Once a stone wall has been identified as requiring dismantling, the following procedures shall be followed:

- Identify stone wall that is required to be temporarily dismantled and notify project team that a site visit is warranted to review the stone wall.
- The National Grid Environmental Scientist, with support from Property Legal and/or cultural/historical consultant, shall determine if permitting or additional permissions are required prior to dismantling stone wall.
- Once permit or permissions have been received, full documentation of wall dimensions (measurements and photographs) shall be submitted to the National Grid Environmental Scientist. Documentation of the wall dimensions shall be marked onto a copy of the applicable EFI access plan (or equivalent plan) with a useful reference for future locating such as GPS coordinates and/or measurement from a permanent reference point (closest structure location or closest cross street, etc.). The wall shall be photographed from all sides with a written description of the photograph (i.e. southern side of wall looking north). In addition, documentation of the length of wall to be dismantled shall be recorded. Take special care to note if granite property bounds (or other marker) are located within the wall so additional survey can be accomplished prior to dismantling in cases where the stone wall represents a property boundary. Site visits by project team (which shall include the National Grid Environmental Scientist) are a mandatory requirement prior to dismantling.
- No dismantling shall take place until documentation has been submitted to the National Grid Environmental Scientist and approved as sufficient documentation.
- Stones from the wall shall be removed from the work area and temporarily stored in nearby location, away from wetlands; buffer zones; rare species habitat and other historical/archeological concerns.
- Avoid dismantling via the "bulldozer" method when possible as this method makes it nearly impossible to rebuild the wall in the same alignment due to its uncontrolled nature.

Dismantling shall be conducted either by hand, with stones stacked as they are removed, or on less "sensitive" walls to use an excavator with a thumb to grab each stone and build a stockpile. Significant ground disturbance below the wall shall be avoided.

Once construction and access in the area has been completed, the wall shall be rebuilt to pre-dismantled conditions or better. If rebuilding a stone walls can not be placed on the same alignment that existed prior to temporary removal, approval from the National Grid Environmental Scientist and Property Legal is required. **Note that if the wall represents a legal property boundary or is historically or culturally significant (or was previously determined to be in a very high quality condition), a professional stone masonry company may be required to document wall alignment, and conduct the dismantling and rebuilding**

11.0 Avian Nest Removal

Avian nest removal shall be done in accordance with EG-304. Consult the National Grid Environmental Scientist prior to removing any nests. There are seasonal restrictions of the removal of avian nests and federal or state permits may be necessary prior to removal

12.0 Drilling Fluids and Additives

Notify the National Grid Environmental Scientist if drilling fluids/additives are proposed to be used on a project. Use and disposal of spent drilling fluids/slurries shall be approved by the National Grid Environmental Scientist, as regulatory approvals and drinking water wells may be of concern. Deactivation and sampling may be required prior to disposal.

13.0 Grounding Wells

The installation of grounding wells shall require erosion controls and proper soil management. Due to the typical depth required for grounding wells (typically 50 to 200 feet or more), erosion controls shall be installed around the proposed well location when working in buffer zone, in proximity to sensitive resources or near slopes. Also, dewatering basins may be required for the proper management of groundwater. The National Grid Environmental Scientist shall be consulted for the disposal of any excess soil.

14.0 Counterpoise and Cathodic Protection

The installation of counterpoise or cathodic protection shall require erosion controls and proper soil management. The National Grid Environmental Scientist shall be consulted for the disposal of any excess soil.

15.0 Gates

When not in use, gates shall be locked with a company-approved lock or double locked with the property owner's lock. New gates may be installed during a project, however, installation of a gate requires permission from the property owner, and may require environmental permitting. Consult with National Grid Real Estate and the National Grid Environmental Scientist prior to installing a new gate, as well as with the appropriate engineering department for the current company gate specifications. Refer to BMPs in Appendix 7. Installation of ROW access restrictions (e.g., stone, bollards, other) at road crossings also require consultation with the National Grid Environmental Scientist and Property Legal.

16.0 Signage

Specific signage may be required by permits or be specified in the EFI to limit access in certain sensitive areas. Signs shall be used to clarify allowed access and sensitive areas, such as:

- "No snow stockpiling beyond this point,"
- "Approved access (to structures A-F)";
- "Do not cross this area until swamp mats are in place";
- "No vehicle crossing";
- "Areas to avoid"; and
- "Environmentally Sensitive Area – Keep Out."

Signs shall be used in conjunction with snow fencing or other physical barriers as demarcation for sensitive areas (e.g., rare species areas, sensitive archeological locations, etc.) that need to be protected and avoided by construction activities. In addition, permit signs required by the regulatory agencies shall be present (i.e. MADEP, RIDEM, EPA (SWPPP), ACOE, etc) at construction sites and/or ROW access points. Construction signage shall be installed and maintained by the contractor performing the work during the project. Absence of signage does not eliminate the need to comply with access plans, permit conditions, and other regulatory requirements. Refer to BMPs in Appendix 7.

17.0 Refueling and Maintenance Operations

17.1 Spill Prevention and Response Plan

Spill controls shall be provided on every field vehicle. Bulk storage of fuels (55 gallons or greater) shall be approved by the National Grid Environmental Scientist prior to being brought on site. The need for a field spill plan shall be evaluated specific to the project for regulatory requirements under SPCC regulations or local ordinances. A field spill plan would include information on fuels and oils being used, approximate amounts in each container or type of equipment, location, fueling location, secondary containment, response and notification procedures, including contact phone numbers, etc. All personnel shall be briefed on spill prevention and response prior to the commencement of construction. The state-specific EG-501 and EG-502 shall be followed in the event of a spill.

Typical construction activities do not require the use or storage of large quantities of oil or hazardous materials (i.e., greater than 55 gallons). However, oil and/or hazardous materials (OHM) may be required in limited quantities to support construction or vehicle operations. Best practices shall be followed in the use and storage of OHM which include but are not limited to: storage and refueling greater than 100 feet from resource areas; maintenance of spill response equipment at work locations sufficient to handle incidental releases from operating equipment; general training for on-site personnel for spill clean up response for incidental releases of OHM; and contracting with an on-call spill response contractor that is capable of managing incidental and significant releases of OHM. There may situations that additional precautions shall be required for the storage or use of OHM (i.e., within wellhead protection areas, GA/GAA areas, Zone IIs). Storage of OHM shall be done in accordance with any applicable regulatory requirements.

17.2 Field Refueling

When refueling vehicles, Company personnel or contractors at field locations shall bring vehicles or equipment (except for fixed equipment such as drill rigs) to an access area outside of environmentally sensitive areas (such as waterways, wetlands, buffer zones or drinking water sources), or as specified in permit conditions and the EFI. A paved area such as a parking lot or roadway is preferred, to minimize the possibility of spill or release to the environment. The driver shall take all usual and reasonable environmental and safety precautions during refueling, such as connecting a safety grounding strap between the fuel tank and vehicle or equipment being refueled. The driver shall frequently check for fuel spills, drips, or seeps during the refueling operation.

Small equipment such as pumps and generators shall be placed in small swimming pools or on absorbent blankets/pads, to contain any accidental fuel spills. Small swimming pools with absorbent blankets/pads, and/or other secondary containment, shall be used for refueling of fixed equipment in wetlands and should be maintained to prevent accumulation of precipitation.

17.3 Grease, Oil, and Filter Changes

Routine vehicle maintenance shall not be conducted on project sites.

17.4 Other Field Maintenance Operations

When other vehicle or equipment maintenance operations (such as emergency repairs) occur, company personnel or contractors at field locations shall bring vehicles or equipment to an access location a minimum of 100 feet away from environmentally sensitive areas (e.g., wetlands or drinking water sources). A paved area, such as a parking lot or roadway, is a preferred field maintenance location to minimize the possibility of spills or releases to the environment.

Crews shall take all usual and reasonable environmental precautions during repair or maintenance operations. Occasionally, it is infeasible to move the affected vehicle or equipment from an environmentally sensitive area to a suitable access area. When this situation occurs, precautions shall be taken to prevent oil or hazardous material release to the environment. These precautions include (but are not limited to) deployment of portable basins or similar secondary containment devices, use of ground covers, such as plastic tarpaulins, and precautionary placement of floating booms on nearby surface water bodies.

17.5 Tools and Equipment

Cleaning of tools and equipment shall be conducted away from environmentally sensitive areas (such as wetlands, buffer zones or drinking water sources) to the maximum extent possible. A paved area such as a parking lot or roadway is preferred, to minimize the possibility of spill or release to the environment. Crews shall wipe up all minor drips or spills of grease and oil at field locations.

18.0 Stabilization Deadlines for Projects Subject to EPA Construction General Permit

18.1 Deadlines to Initiate Stabilization Activities (Permanent and Temporary)

Soil stabilization measures shall be implemented immediately whenever earth-disturbing activities have permanently or temporarily ceased on any portion of the project. The following are some examples of activities that constitute initiation of stabilization:

- Preparing the soil for vegetative or non-vegetative stabilization;
- Applying mulch or other non-vegetative product to the exposed area;
- Seeding or planting the exposed area;
- Finalizing the arrangements to have stabilization product fully installed in compliance with the deadlines to complete stabilization in Section 18.2 below.

18.2 Deadlines to Complete Stabilization Activities (Permanent and Temporary)

As soon as practicable, but no later than 14 calendar days or 7 calendar days (for areas discharging to a sensitive water) after the initiation of soil stabilization measures commence the following should be completed:

- For vegetative stabilization, all activities necessary to initially seed or plant the area to be stabilized; and
- For non-vegetative stabilization, the installation or application of all such non-vegetative measures.

18.3 Vegetative Stabilization (all except for arid, semi-arid, or on agricultural lands)

- Provide established uniform vegetation (e.g., evenly distributed without large bare areas), which provides 70% or more of the density of coverage that was provided by vegetation prior to commencing earth-disturbing activities. Avoid the use of invasive species as cover.
- For final stabilization, vegetative cover must be perennial; and
- Immediately after seeding or planting a disturbed area to be vegetatively stabilized, a non-vegetative erosion control must be implemented to the area while the vegetation is becoming established. Examples include; mulch and rolled erosion control products.

18.4 Vegetative Stabilization (Agricultural Lands)

- Disturbed areas on land used for agricultural purposes that are restored to their pre-construction agricultural use are not subject to vegetative stabilization standards.

18.5 Non-Vegetative Stabilization

If using non-vegetative controls to stabilize exposed portions of your site, or if you are using such controls to temporarily protect areas that are being vegetatively stabilized, you must provide effective non-vegetative cover to stabilize any such exposed portions of the site. Examples of non-vegetative stabilization techniques include, but are not limited to, rip-rap, gabions, and geotextiles.

19.0 Clean-up and Restoration Standards

The following steps shall be taken once construction has been completed at each location along the ROW or within the project site. The following are minimum guidelines for clean-up and stabilization standards. Please refer to permit conditions for project-specific related standards. Refer to the EFI for applicable permit requirements andto determine if the site needs to be reviewed and approved by the permitting authorities prior to removal of erosion controls.

19.1 Removal of Sedimentation and Erosion Controls

After all work has been satisfactorily completed and vegetation has been re-established to a minimum of 75% cover, and upon approval by the National Grid Environmental Scientist, all non-biodegradable materials (e.g., siltation fencing, straw bale strings, stakes, straw wattle mesh casing, etc.) shall be disposed of properly off-site.

Dependent on permit requirements, sedimentation and erosion controls may not be allowed to be removed until after inspection and approval by one or more permitting authority. In most cases, removed straw bales may be used to mulch disturbed areas. Remaining straw bales that do not block the flow of water may be left in place unless they are required to be removed pursuant to permit conditions. Straw bales that block the flow of water shall be removed.

Prior to project construction being completed, the project team will develop post-construction inspection intervals to ensure timely removal of temporary BMPs. BMPs will be removed when the area is stabilized, which typically occurs when the area has either naturally stabilized (75 % cover), or seed and mulch that was installed has achieved 75% cover.

19.2 In-Situ Restoration

Unless otherwise specified in permits or prescribed by the National Grid Environmental Scientist or the Project Environmental Consultant, all disturbed areas, including stream banks, wetlands and access routes, shall be restored following the completion of work. When the work is completed and swamp mats have been removed, the National Grid Environmental Scientist or Project Environmental Consultant shall conduct an inspection. Wetlands shall be inspected for build up of sand or other materials that may have fallen through swamp mats. Care shall be taken to inspect wetland crossings carefully after swamp mat removal to ensure any materials are properly removed and disposed of off-site.

Restoration of Soil Compaction. If rutting or soil compaction following swamp mat removal is observed, the area shall be returned to pre-existing conditions, and comparable to the surrounding area, by light hand raking or by back-blading with machinery. Restoration shall be overseen by the Project Environmental Consultant or National Grid Environmental Scientist. Deep ruts (>12") shall be filled in using available, loose soil from the work area.

Seeding and Mulching. If adequate root and seed stock are absent and have been stripped from the area, graded sites shall be promptly stabilized by applying an approved seed mix and mulching with straw to reduce erosion and visual impact. Seeding and mulching shall be completed as soon as possible following completion of work at the site. For some wetland areas, natural re-vegetation may be more appropriate than seeding disturbed sites. Wetland areas where adequate root and seed stock are absent will be seeded using an approved wetland native seed mix. For some wetland areas, natural re-vegetation may be more appropriate than seeding disturbed sites. Refer to BMPs in Appendix 7 for seed mix tables and mulch ratio tables.

If needed, the import of quality topsoil onto the ROW will be required. Topsoil should be tested, and approved by the Project Environmental Consultant or National Grid Environmental Scientist to determine its suitability for site conditions. Fertilizers will be approved on a case-by-case basis.

For upland areas, the disturbed vegetation and soil shall be restored and stabilized[6] by regrading the area to pre-existing conditions, if needed, seeding (if adequate root and seed stock are absent) and mulching the exposed soil, and removing strings and stakes from straw bales and using broken up straw bales for the mulch. Siltation fencing, strings and stakes shall be removed for disposal as ordinary waste. Refer to BMPs in Appendix 7 for seed mix tables and mulch ratio tables.

Excess boulders. Additional boulders could be used at proposed and existing gate locations to use on either side of the gates as a deterrent for unauthorized vehicle access or be placed along the edges of work pads where steep slopes are present for safety purposes. The final placement of boulders should be reviewed prior to installation with Stakeholder Relations and the National Grid Environmental Scientist or Project Environmental Consultant.

Unless otherwise specified in Project-specific permit conditions, the National Grid Environmental Scientist or Project Environmental Consultant shall develop an inspection frequency to monitor restored areas for stabilization, germination and successful revegetation.

19.3 Invasive Species

All equipment shall be certified clean[7] utilizing the attached form (Appendix 8) or equivalent as approved by by the vendor prior to mobilization to the work site. The vendor shall use the certification from provided as Appendix 8 to document compliance with invasive species management BMPs, Clean is defined as being free of plant matter (stems, flowers, roots, etc), soil,

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[6] For projects subject to the 2012 CGP, stabilization is required within 14 days, or within 7 days for sensitive areas.

[7] The Appendix 8 certification form (or equivalent as approved by National Grid Environmental scientist) shall be used to document the clean certification

or other deleterious materials prior to being brought to the project site. Any equipment that has been placed or used within areas containing invasive species within the project site shall be cleaned of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials at the site of the invasive species prior to being moved to other areas on the project site to prevent the spread of invasive species from one area to another[8]. **Equipment shall be cleaned prior to being removed at the completion of the project: exceptions to this requirement shall be determined on a case-by-case basis.** Consult with the National Grid Environmental Scientist prior to discharging or disposing of any waste water or waste material from the cleaning of equipment.

19.4 Cleaning of Equipment

At the completion of the project, Equipment shall be cleaned prior to being de-mobilized to prevent tracking of material onto roads and causing safety issues. Consult with the National Grid Environmental Scientist prior to discharging or disposing of any waste water or waste material from the cleaning of equipment

19.5 Access Routes (Cross Country Routes)

Cross country access routes shall be returned to pre-construction grade (if needed), seeded (if adequate root and seed stock are absent) and mulched. Pre-existing sandy soils within mapped rare turtle habitat shall not be seeded unless directed by the National Grid Environmental Scientist so as to not alter nesting habitat.

19.6 Access Roads

Constructed gravel roads shall be left in place following project completion unless permit conditions require their removal. Refer to the specific permit conditions for these provisions. If the road is to be removed, the crushed stone and geotextile fabric shall be removed from the work site. This excess material can be retained off-site for future maintenance-related access needs. Seeding and/or mulching of gravel roads is generally not required, unless necessary to prevent erosion.

19.7 Stone Work Pads

Unless permit conditions or property owner's require the removal of constructed stone work pads following project completion, constructed work pads shall be left in place. Refer to the specific permit conditions for these provisions.

19.8 Construction Materials on ROWs

As soon as the structure work has been completed, all used parts and trash are to be picked up and removed from the project site. Retired poles shall be removed in accordance with National Grid Engineering Standard SP,06.01.301. In some cases, the used material from structure work may be temporarily stored at the work area by placing it out of the wetlands or other sensitive resource area until work in the adjacent areas has been completed. However, treated wood poles shall never be stored in standing water or in wetlands. If the project is cancelled, all material shall be removed

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[8] On ROW projects where multiple wetlands may be dominated by the same invasive species, cleaning may not be required for movement along the ROW. Check with the National Grid Environmental scientist for guidance.

from the project site. Excess material brought to the project site shall be removed upon project completion. Consult with the National Grid Environmental Scientist on whether the work site shall be restored in addition to the measures outlined in 8.14.1 to 8.14.5 above

19.9 Improved Areas

Yards, lawns, agricultural areas, and other improved areas shall be returned to a condition at least equal to that which existed at the start of the project. Alternately, if requested, the property owner may be reimbursed to perform their own restoration, after the site has been left in an environmentally sound manner. If this option is requested, it shall be documented in a written release signed by the property owner. Consult with National Grid Real Estate and/or Stakeholder Relations for the details on existing agreements. Off-ROW access shall never be assumed and shall be coordinated through Real Estate before being implemented. Depending on the access point, swamp matting, composite matting or other BMPs may be required to prevent ruts, lawn damage, or other property damage. Restoration following the completion of work and any use of improved areas shall be conducted in accordance with 8.14.2 above

19.10 Property Damage

All damage to property occurring as a result of a project shall be immediately repaired or replaced. In some locations, it may be desirable to document pre-existing damage prior to work commencing in that area in order to demonstrate afterwards that the damage did not result from the project. Work crews, the Project Environmental Consultant or the National Grid Environmental Scientist shall document repairs that were performed in response to damage from unauthorized vehicle use.

19.11 Overall Work Site

Upon satisfactory completion of work, the construction personnel shall remove all work-related trailers, buildings, rubbish, waste soil, temporary structures, and unused materials belonging to them or used under their direction during construction, or waste materials from previous construction and maintenance operations. All areas shall be left clean, without any litter or equipment (wire, pole butts, anchors, insulators, cross-arms, cardboard, coffee cups, water bottles, etc.) and restored to a stable condition and as near as possible to its original condition, where feasible. Debris and spent equipment shall be returned to the operating facility or contractor staging area for disposal or recycling (cardboard) as appropriate in accordance with EG-111.

19.12 Material Storage/Staging and Parking Areas

Upon completion of all work, all material storage yards, staging areas, and parking areas shall be completely cleared of all waste and debris. Unless otherwise directed or unless other arrangements have been made with an off ROW or off-property owner, material storage yards and staging areas shall be returned to the condition that existed prior to the installation of the material storage yard or staging area. Regardless of arrangements made with a landowner, all areas shall be restored to their pre-construction condition or better. Also any temporary structures erected by the construction personnel, including fences, shall be removed by the construction personnel and the area restored as near as possible to its original condition, including seeding and mulching as needed.

20.0 Notification of Emergency Work

Because it is sometimes difficult to identify wetlands and other sensitive environmental areas, the National Grid Environmental Scientist shall be notified within 24 hours or by the next working day whenever emergency off-road repair work takes place. Although the routine maintenance and emergency repair work is generally allowed, due to site conditions or the scope of the project, notification to the regulating agencies may be required

21.0 Appendices

APPENDIX 1:	Glossary
APPENDIX 2:	Acronyms
APPENDIX 3:	EFI Template
APPENDIX 4:	Simplified EFI Template
APPENDIX 5:	Standard STORMS boilerplate language
APPENDIX 6:	Storm Water, Wetlands & Priority Habitat Environmental Compliance Site Inspection / Monitoring Report Form
APPENDIX 7:	BMP Drawings and Guidelines
APPENDIX 8:	Certification Sheet for Invasive Species Control

Appendix 1 – Glossary

Access Road – An existing, periodically maintained road often consisting of gravel and/or exposed soils or vegetated with grasses but devoid of woody vegetation, that is visible on aerial photography and shown on ROW T-sheets. May include newly permitted permanent roads (i.e., roads to be constructed in accordance with a project-specific permit).

Access Route - A pathway previously used or proposed to be used by crews for access along the ROW. Routes may be shown on ROW T-sheets or previous project access plans but are not improved as maintained gravel/exposed soil roads. Access routes may be mown and can consist of trails utilized by recreational vehicles.

Action Logs – Project-specific log used to document action items required for permit compliance. The log identifies timeframes for completion and responsible parties. The log is typically updated by the Project Environmental Consultant or the National Grid Environment Scientist and circulated to the project team on a weekly, or more frequent, basis.

Bank – The transitional slope immediately adjacent to the edge of a surface water body, the upper limit of which is usually defined by a break in slope, or, for a wetland, where a line delineated in accordance with applicable state and federal regulations that indicates a change from wetland to upland.

BMP – Best Management Practice. Individual engineered constructions or operating procedures intended to minimize and mitigate soil disturbance, erosion, sedimentation, turbid discharges, and/or impacts to sensitive receptors.

Clean - free of plant matter (stems, flowers, roots, etc), soil, or other deleterious materials prior to being brought to the project site.

Clean Gravel – Gravel is a type of coarse-grained soil that consists of small stones and other mineral particles. Clean Gravel shall meet the requirements in accordance with National Grid Standard Construction Specification for Electric Stations (Engineering Standard SP.08.00.001) Clean Gravel will not have fine materials that could lead to a turbid discharge.

Clean Stone (Crushed Stone) – Clean Stone (Crushed Stone) shall meet the requirements in accordance with National Grid Standard Construction Specification for Electric Stations (Engineering Standard SP.08.00.001). Clean Stone will not have fine materials that could lead to a turbid discharge.

Clearing – The cutting of trees and large bushes by hand and/or mechanical means.

Compost Socks – Tubular devices comprised of non-degradable, photodegradable, or biodegradable mesh tubing containing organic compost matrix. Compost socks are effective for intercepting site runoff, trapping sediment, and treating for soluble pollutants by filtering stormwater runoff. .

Compost socks are a useful sedimentation control device along construction site perimeters, as check dams in drainage channels, as a slope interruption practice on long and/or steep slopes, and around drain or street curb inlets.

Corduroy Road – Corduroy roads are cut trees and/or saplings with the crowns and branches removed, and the trunks lined up next to one another.

Dewatering Basin – An established containment area for saturated materials and pumped discharges. This measure is used for the purpose of de-watering soils prior to transport off site or for use in another location on site, and for allowing suspended sediment to settle out of pumped discharges.

Detention/Retention Basin – A detention/retention basin is designed for the purpose of detaining or retaining water. A dewatering basin is a form of detention basin

Dewatering – Use of a system of pumps, pipes and temporary holding dams to drain or divert waterways or wetlands, or lower the groundwater table before and during excavation activities.

Drainage Ditch or Swale – a clearly noticeable channel that is typically dry, except after precipitation events. Intermittent and perennial streams and rivers are not included in this definition.

Dredge – To dig, excavate, or otherwise disturb the contour or integrity of sediments in the bank or bed of a wetland, a surface water body, or other area within the regulating bodies' jurisdiction.

Dredge Spoils – Material removed as the result of dredging.

Embankment – A protective bank constructed of mounded earth or fill materials located between a roadway (or rail bed) and a seasonal stream or other wetland.

Environmental Field Issue – Document that contains copies of all project-specific environmental permits and summarizes all environmental permit conditions. The EFI is prepared by the Project Environmental Consultant or the National Grid Environment Scientist and copies are provided to the Project Manager, Construction Supervisor(s), and other team members as appropriate.

Environmental Monitoring Records – Examples of checklists and/or monitoring reports suggested for use by the Company Environmental Engineer to document conformance of the project with this Environmental Guidance and or project specific permit/license conditions.

Environmental Scientist – Formerly Environmental Engineer. The National Grid Environmental Department representative for the project or the territory where the work is located. For a map of Environmental Department staff territories, refer to the Environmental page of the National Grid infonet.

Environmentally Sensitive Areas – Examples of environmentally sensitive areas that may be found on National Grid properties are rivers, streams, ponds, lakes, wetlands, bogs, swamps, salt marshes, rare species habitat, wellhead protection areas, cultural sites, parks, preserves, schools and as otherwise defined by Federal, State or local regulations. Refer to EG-301.

Erosion Controls – The utilization of methods to prevent soil detachment and minimize displacement or washing down slopes by rainfall or run-off. Common practices include, but are not limited to:

(a) Temporary and Permanent Seeding

(b) Mulching, Soil Binders, Tackifiers

(c) Erosion Control Blankets

(d) Hydraulic Erosion Control

Excavate/Excavation – To dig, remove, or form a cavity or a hole in an area within the department's jurisdiction.

Fill (n.) – Any rock, soil, gravel, sand or other such material that has been deposited or caused to be deposited by human activity.

Fill (v.) – To place or deposit materials in or on a wetland, surface water body, bank or otherwise in or on an area within the jurisdiction of the department.

Flats – Relatively level landforms composed of unconsolidated mineral and organic sediments usually mud or sand, that are alternately flooded and exposed by the tides and that usually are continuous with the shore.

Frozen condition – Field conditions when the upper portion of the ground surface freezes or when areas of standing water freeze solid such that vehicle passage over these areas is supported without any resulting soil disturbance. The frozen conditions must have been affected by severe cold (maximum daily temperatures less than 32 degrees F) for a continuous 2-week period.

GAA – Rhode Island groundwater classification, groundwater resources that are know or presumed to be suitable for drinking water use without treatment and are located in one of the three areas described below.

a) The state's major stratified drift aquifers that are capable of serving as a significant source for a public water supply ("groundwater reservoirs") and the critical portion of their recharge area as delineated by DEM;

b) The wellhead protection area for each public water system community water supply well. Community watrer supply wells are those that serve resident populations and have at least 15 service connections or serve at least 25 individuals, e. g. municipal wells and wells serving nursing homes, condominiums, mobile home parks, etc.; and

c) Groundwater dependent areas that are physically isolated from reasonable alternative water supplies and where existing groundwater warrants the highest level of protection. At present only Block Island has been designated as meeting this criterion..

GA – Rhode Island groundwater classification, groundwater resources that are know or presumed to be suitable for drinking water use without treatment. However, groundwater classified by GA does not fall within any of the three priority areas described under the GAA classification.

Grade/Grading – The movement of soil and fill material to change the elevation of the land. The term refers to the combined actions of excavating and filling to change elevation or shape.

Grubbing – The removal of stumps/roots by mechanical means during site preparation activities.

Immediately - As soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

In-kind replacement - replacement using the same material, functional inverts, diameter and length as the existing item. In-kind replacement includes the substitution of a structure with a similar structure in approximately the same location as is practicable, and is approximately the same in design. The design may be altered to meet applicable utility standards, and may include alternate materials designed to prolong the life of that service.

Intermittent Stream – A stream that flows for sufficient time to develop and maintain a defined channel, but which might not flow during dry portions of the year.

In the Dry – Work done either during periods of low water or behind temporary diversions, such as Earth Dike / Drainage Swale and Lined Ditches designed and installed in accordance with best management practices.

Limit of Work/Disturbance – The approved project limits within regulated areas. All project related activities in regulated areas must be conducted within the approved limit of work/disturbance. The limit of work/disturbance shall be depicted on the approved permit site plans and in the EFI plans. Where it is warranted National Grid may require that these limits be identified in the field by flagging, construction fencing, and/or perimeter erosion controls.

Long-Term Restoration Logs - Project-specific log used to document restoration required following the completion of construction or as areas of the project have been completed (i.e., segments of ROW for a multi-mile project). The log is typically updated by the Project Environmental Consultant or the

National Grid Environment Scientist Environment Scientist and circulated to the project team on a weekly basis.

Low Flow Conditions – Low water flow that generally occurs during the summer, as a result of decreased precipitation and the removal of water by increased evaporation and evapotranspiration by vegetation. Work done under low-flow conditions minimizes the potential for environmental damage. The USACE defines the calendar dates for low flow conditions in its New England state-specific Programmatic General Permits.

Low Ground Pressure – equipment that meets the regulatory requirement of < 3 Pounds per Square Inch (PSI) ground pressure when loaded. Use of LGP equipment ***requires approval*** from the National Grid Environmental Scientist.

Marsh – A wetland:

a) That is distinguished by the absence of trees and shrubs;

b) Dominated by soft-stemmed herbaceous plants such as grasses, reeds, and sedges; and

c) Where the water table is at or above the surface throughout the year, but can fluctuate seasonally.

Methods – Are the construction practices and procedures that take place through choosing the proper equipment, trucks and labor to execute the earth moving activities based on the existing conditions and implementing creative and sensitive scheduling for the daily activities.

NHESP - Natural Heritage Endangered Species Program; a department within the Massachusetts Division of Fisheries and Wildlife that is responsible for protecting the 176 species of vertebrate and invertebrate animals and 259 species of native plants that are officially listed as Endangered, Threatened or of Special Concern in Massachusetts.

Perennial – A stream that contains water at all times except during extreme drought.

Permanently Ceased – Is applicable to earth disturbance activities when clearing and excavation within any area of the Project that will not include permanent structures has been completed.

Person-in-Charge – A National Grid Project Engineer, Manager, Supervisor, Field Construction Coordinator or equivalent Contractor personnel assigned to oversee and coordinate work activities.

Processed Gravel – Processed Gravel shall meet the requirements in accordance with National Grid Standard Construction Specification for Electric Stations (Engineering Standard SP.08.00.001) Processed Gravel will not have fine materials that could lead to a turbid discharge. Gravel consisting of inert material that is hard, durable stone and is free from loam and clay, surface coatings and deleterious materials.

Regulating Body – Federal, State, or local authority that has jurisdiction over resource areas that may be impacted by company operations

Regulated Wetland Area – Those areas that are subject to federal, state or local wetland regulation, including certain buffer or adjacent areas.

Repair – The restoring of an existing legal structure by partial replacement of work, or broken, or unsound parts (Env-Wt 101.73).

Replacement – The substitution of a new structure for an existing legal structure with no change in size, dimensions, location, configuration, construction, or which conforms in all material aspects to the original structure

Right-of-Way – A corridor of land where National Grid has legal rights (either fee ownership, lease or easement) to construct, operate, and maintain an electric power line and/or natural gas pipeline and may include work on customer owned properties.

River – A watercourse that is larger than a perennial stream and flows all year long.

Routine Utility Rights-of-Way Maintenance Activity – Includes but is not limited to vegetation management and repair or replacement of existing utility structures.

Sedimentation Controls – Silt fences, straw bales, compost socks/berms and other barrier devices strategically placed to intercept and treat sediment-laden site runoff.

Sensitive Water - Includes any sediment or nutrient impaired water or a water that is identified by the state, tribe or EPA as Tier 2, 2.5 or Tier 3 for antidegradation purposes.

Siltation Curtain – An impervious barrier erected to prevent silt and sand and/or fines from being washed into a wetland, surface water body or other area of concern.

Surface Water Body or Surface Waters – Those portions of waters which have standing or flowing water at or on the surface of the ground.

Spill Prevention, Control and Countermeasure Plans – Required for site operations that involve the storage of 1,320 gallons or greater of fuel and oils, both in storage containers and stored in equipment. Response actions to spills and releases are specified in these plans.

Swamp Mats – Components of a temporary wood, plastic or other suitable material used as a BMP to cross sensitive areas or provide a stable working surface.

Stormwater Pollution Prevention Plan – A site-specific, written document that, among other things: (1) identifies potential sources of stormwater pollution at a construction site; (2) describes stormwater control measures to reduce or eliminate pollutants in stormwater discharge from a construction site;

and (3) identifies procedures the operator will implement to comply with the terms and conditions of EPA NPDES Construction General Permit (CGP). SWPPPs must be prepared, maintained on-site, and amended as necessary in order to obtain NPDES permit coverage for specific construction site stormwater discharges under the EPA NPDES CGP.

Temporarily Ceased - Is applicable when there are earth disturbance activities such as clearing, grading, and/or excavation that are not complete, but will be idle in one area for a period of up to 14 or more calendar days, and which will resume in the future. The 14 calendar day timeframe begins as soon as you now that construction work on a portion of the Project will be left incomplete and idle. In circumstances where there are unanticipated delays and you do not know at first how long the work stoppage will continue, the requirement to immediately initiate stabilization is triggered as soon as you know with reasonable certainty that work will be stopped for 14 or more additional calendar days.

Tidal Wetlands – A wetland whose vegetation, hydrology or soils are influenced by periodic inundation or tidal waters.

Topsoil – The uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils and ranging in depth from 2 to 10 inches.

Turbidity – The condition in which solid particles suspended in water make the water cloudy or even opaque in extreme cases.

United States Geological Survey topographic map – A map that uses contour lines to represent the three-dimensional features of a landscape on a two-dimensional surface. These maps use a line and symbol representation of natural and artificially created features in an area.

Wetland – An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation (more than 50 percent) typically adapted for life in saturated soil conditions (hydric soils). Wetlands include but are not limited to swamps, marshes, bogs, and similar areas.

Work Site – An area where work is performed.

Worker – Company employee, contractor, consultant working on site.

Zone II - Massachusetts - That area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation). It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone IIs shall extend up gradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide, a contact with till or bedrock , or a recharge boundary).

Appendix 2 – Acronyms

ASTM	American Society for Testing and Materials
BMP	Best Management Practices
EFI	Environmental Field Issue
EG	Environmental Guidance
EPA	Environmental Protection Agency
GA/GAA	Rhode Island Groundwater Classifications – see glossary
LGP	Low Ground Pressure
MA	Massachusetts
MA DEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
NE	New England
NH	New Hampshire
NH DES	New Hampshire Department of Environmental Services
NHESP	Natural Heritage Endangered Species Program
NPDES	National Pollutant Discharge Elimination System
OHM	Oil and/or Hazardous Materials
PSI	Pounds per square inch
RI	Rhode Island
RI DEM	Rhode Island Department of Environmental Management
RI CRMC	Rhode Island Coastal Resources Management Council
RI SESC	Rhode Island soil erosion and sediment control
ROW	Right-of-Way
RTE	Rare, Threatened or Endangered
SPCC	Spill Prevention, Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
TOY	Time-of-Year
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
VT	Vermont
VT DEC	Vermont Department of Environmental Conservation

Zone II	Massachusetts Groundwater Protection district – see glossary

Appendix 3 – EFI template

See EG303NE_Form1 for the EFI template

Appendix 4 – Simplified EFI template

See EG303NE_Form2 for the Simplified EFI template

Appendix 5 – Standard STORMS boilerplate language

See EG303NE_Form3 for examples of standard STORMS boilerplate language

Appendix 6

National Grid
Storm Water, Wetlands & Priority Habitat Environmental Compliance Site Inspection / Monitoring Report

Project Name:

Date:

City / Town:

Time:

WO/WR #

Distribution Alliance Contractor Project? ☐ No ☐ Yes Identify Contractor

Current Weather Conditions:

Precipitation Since Last Inspection (Date, Est. Duration and Est. Amount from Each Storm):

Activities/Structures/Locations Inspected:

Identify Locations/Activities/Structures Within Designated Priority Habitat (Identify Rare Species Observations, if any) and Mitigation/Restoration Measures Implemented:

Any Significant Discharges of Sediment to Water Bodies or Wetlands? (If "yes," state locations):

Compliance with SWPPP Storm Water Controls, O&M Plan, Order of Conditions or Other Applicable Environmental Requirements? (Explain if "no" for any feature inspected):

Additional BMPs or Other Corrective Action Needed and, if so, Where?

Page 3

Compliance with Previous Observations?

Are Spill Control Supplies Available? ☐ Yes ☐ No

Are Oil and/or Hazardous Materials Stored On-Site? ☐ Yes ☐ No

If So, Are They Properly Labeled and Managed? ☐ Yes ☐ No

Are Wastes Stored On-Site? ☐ Yes ☐ No *If So, Are They Properly Managed?* ☐ Yes ☐ No

Miscellaneous (e.g., dumping?):

Comments:

Name: Title/ Company:

Reference: EG-303NE

Appendix 7 – BMPs

See EG303NE_Form4 for a list of BMPS

See EG303NE_Form5 for BMP details

APPENDIX 8
CERTIFICATION FORM FOR INVASIVE SPECIES CONTROL

Certain permit conditions, therefore a Condition of Contracts for the Prime Contractor, any Subcontractors, and any equipment or mat vendors for ***National Grid Projects*** shall be required to Certify their equipment[9] {each piece of equipment used on site} as 'clean'[10].

________________________________ (*name of firm*) hereby Certifies that

________________________________ (*make, model, and/or type*)

________________________________ (*equipment ID tag or #)* meets the following

1. before entry on to the job site, has been sufficiently cleaned to remove all accumulated mud, debris, plant fragments, and detritus that could harbor seeds, roots, or plant fragments of so-called invasive plant species; and
2. that the above piece of equipment has neither been off-loaded nor operated in the interval between cleaning and delivery to the jobsite.
3. that equipment deployed in areas of invasive species (as identified in project plans) shall be cleaned prior to redeployment

________________________ (*signed*) ____________ (*dated*)

________________________ (*printed name*) __________________________ (*title*)

________________________ (*Firm*)

The signed original of this form {one for each piece of equipment (or lot[11] of mats)} is to be given to the NG Field Construction Coordinator assigned to the project.

---

[9] Equipment may include, but is not limited to bulldozers, excavators, backhoes, bucket trucks (tracked or wheeled), pulling equipment, concrete trucks, compressors, drilling equipment, and mats (composite, wood, or other materials).

[10] With regard to invasive species, the definition of clean means free of accumulated mud, debris, plant fragments, and detritus that could harbor seeds, roots, or plant fragments of so-called invasive plant species.

[11] Lot of mats is the number of mats that may be transported by one forwarder/truck at a time.

Record of Change		
Date of Review/Revision:		
Revision	**Date**	**Description**
0	1/23/12	Issued New England Specific EG-303 NE
1	04/22/13	Stone wall dismantling edits.
2	1/23/14	added bmp # 39, edited text on p40 to reference form1 and form2
3	08/29/14	Added section on communication of project specific environmental requirements (2.5), added appendices for EFI, simplified EFI, and STORMS boilerplate language. Added language concerning removal of BMPs (18.1). Minor edits to BMP details, and renumbered appendices. Added swamp mat transition, mat air bridge and silt sack BMP details.
4	2/5/15	Adding additional language about signage and demarcation of rare species populations and historic resources.
5	07/01/2015	Revised construction entrances/exits (5.2) per R170 audit findings.
6	09/08/2015	Added 4.1 (Refreshing of wetland flagging), revised 9.7 (stockpiling on mats), added 18.0 (stabilization deadlines) revised 19.2 (in-situ restoration), and edited BMP details (straw wattle, seeding options), added rock ford detail.

Attachment G

Merrimack Valley Reliability Project

Tewksbury, Andover, Dracut, Massachusetts

Secretary's Certificate and Comment Letters Received on the DEIR

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October 16, 2015

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Merrimack Valley Reliability Project
PROJECT MUNICIPALITY	: Tewksbury, Andover, and Dracut
PROJECT WATERSHED	: Shawsheen and Merrimack
EEA NUMBER	: 15283
PROJECT PROPONENT	: New England Power Company d/b/a National Grid
DATE NOTICED IN MONITOR	: September 9, 2015

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA Regulations (301 CMR 11.00), I have reviewed the Draft Environmental Impact Report (DEIR) and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations. The Proponent should prepare and submit for review a Final Environmental Impact Report (FEIR) based on the Scope contained herein.

Project Description

As described in the Environmental Notification Form (ENF) and the DEIR, the Merrimack Valley Reliability Project (MVRP) consists of the construction of a new 345-kilovolt (kV) electric transmission line (3124 Line) within an existing right-of-way (ROW) between the Tewksbury 22A Substation in Tewksbury and the Scobie Pond Substation in Londonderry, New Hampshire. The Proponent is required to maintain its system consistent with the reliability standards and criteria developed by the North American Electric Reliability Corporation, the Northeast Power Coordinating Council (NPCC), and the New England Independent System Operator (ISO-NE).

The MVRP is one of the major independent components of an overall plan (AC Plan) recommended for study by the ISO-NE Greater Boston Working Group to resolve identified reliability needs affecting the electric transmission system that serves the New Hampshire - Massachusetts region, and the Greater Boston area in particular. The electric system in this area is heavily used and tightly integrated; under stressful operating conditions, key elements of the area transmission system would be loaded beyond their capacity and warrant additional transmission infrastructure or other system resources to reliably serve the area. Other major elements of the proposed AC Plan include an eight-mile 345 kV underground cable from Wakefield to Woburn, and an eight-mile underground cable from Woburn to Mystic Station.

The AC Plan was selected as the preferred plan subsequent to consideration of two plans by ISO-NE to meet regional reliability needs. In addition to the AC Plan, ISO-NE also considered a high voltage direct current plan (HVDC Plan) proposed by New Hampshire Transmission (NHT), which principally consisted of installing a new 68-mile submarine cable from Seabrook Station, New Hampshire to Mystic Station, as well reconductoring 16 miles of 345-kV line from Sandy Pond, New Hampshire to Tewksbury, Massachusetts, and bifurcating an existing 345-kV cable between Mystic Station and North Cambridge.

The total length of the MVRP will be 24.4 miles in New Hampshire and Massachusetts. MEPA review is limited to that portion of the MVRP to be located within Massachusetts (the project). The project is proposed on a portion of the Fifteen Mile Falls ROW. The ROW begins at the Tewksbury 22/22A Substations in Tewksbury and continues northward for 6.5 miles to the Massachusetts/New Hampshire border. Currently there are up to five existing transmission lines within this segment of the Fifteen Mile Falls ROW, including one 345-kV line (397 Line), two 230 kV lines, and two 115 kV lines. In some locations, additional distribution circuits are also located within the ROW. The arrangement of existing facilities along the ROW varies over the 6.5 miles. The width of the ROW in Massachusetts varies from 225 feet to 520 feet.

The MVRP includes the following elements:

- Installation of the new 24.4-mile (6.5 miles in Massachusetts) 345-kV 3124 Line on existing ROW from the Proponent's Tewksbury 22A substation in Tewksbury to the Scobie Pond substation owned by the Public Service Company of New Hampshire in Londonderry, New Hampshire;
- Interconnection of the 3124 Line to the system at the northern and southern terminal substations;
- Reconductoring of the 115-kV Y-151 Line; and
- Reconfiguration of several other existing lines within the ROW.

The installation of this new line is anticipated to relieve potential overloads under various operating conditions on elements of the area transmission system. The project is proposed to ensure continued compliance with applicable federal and regional transmission system reliability standards and criteria, and will maintain reliable electric service to customers in the area. In some sections, the 3124 Line will be built on new structures; in other sections, one or more of the existing lines will be relocated on a new series of structures and the 345-kV line in the corridor will be redesignated as the 3124 Line. New or reconstructed structures will include steel H-frame, davit arm, three-pole and single-pole structures. The project will include 184 structures that will either be directly embedded or constructed on a caisson foundation and will increase in height from a range of 35 to 95 feet to a range of 45 to 115 feet. The project will build or relocate approximately 15.9 circuit miles of transmission lines.

The 6.5-mile project corridor located within the towns of Tewksbury, Andover and Dracut passes through a number of wetland resource areas including: Bordering Vegetated Wetlands (BVW), Bordering Land Subject to Flooding (BLSF), Bank, Land Under Water and Waterways (LUWW), and Riverfront Area. Permanent BVW impacts will be limited to approximately 2,600 square feet (sf) of fill for proposed pole foundations. According to the DEIR, other wetland impacts will be primarily temporary, construction-related impacts associated with the installation of utilities and placement of swamp mats to allow for equipment access and work areas. Temporary impacts to wetlands within the corridor will include: alteration of approximately 17.9 acres of BVW, including the alteration of 13.3 acres for the placement of swamp mats and the conversion of 4.6 acres of forested BVW to scrub-shrub BVW due to maintenance of vegetation within the ROW; and alteration of 330 linear feet (lf) of Bank, 0.75 acres of LUWW, 2.3 acres of Riverfront Area, and 2.2 acres of BLSF. The project will also alter 13.5 acres of land as a result of clearing (4.6 acres within forested wetlands).

Land uses adjacent to the project ROW include forested areas, wetlands, open fields, and a mix of commercial/industrial and residential areas. The transmission lines will pass over Interstate 495 (I-495), a state highway and several local roadways. The ROW crosses the Merrimack River and several perennial and intermittent streams. North of the Merrimack River in Dracut, portions of the project ROW pass through active and inactive sand pits and gravel yards. Six parcels that intersect the ROW are identified as Protected or Recreational Open Space. The project corridor passes through areas identified by the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP) as *Priority* and *Estimated Habitat* for several rare species. Archaeological resources have been documented within the project ROW.

Jurisdiction and Permitting

The project is subject to a Mandatory EIR pursuant to 301 CMR Section 11.03(3)(a)(1) of the MEPA regulations because it requires State Agency Actions and will alter one or more acres of BVW. The project also exceeds the ENF threshold at 301 CMR 11.03(3)(b)(1)(f) for alteration of one half or more acres of any other wetlands. The project may also trigger the ENF threshold at 301 CMR 11.03(2)(b)(2) for the take of an endangered or threatened species or species of special concern. The project will require a 401 Water Quality Certificate (401 WQC) and a Minor Modification to an existing Chapter 91 (c. 91) License from the Massachusetts Department of Environmental Protection (MassDEP), review in accordance with the Massachusetts Endangered Species Act (MESA) by the Natural Heritage and Endangered Species Program (NHESP), and a Non-Vehicular Access Permit from the Massachusetts Department of Transportation (MassDOT). A Petition to Construct and Zoning Exemptions will be required from the Massachusetts Department of Public Utilities (DPU). The project is subject to the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol (Policy).

The project will also require Orders of Conditions from the Tewksbury, Andover, and Dracut Conservation Commissions, or in the case of an appeal, Superseding Order(s) of Conditions from MassDEP. The project will require consultation with the Massachusetts Historical Commission (MHC) in accordance with Section 106 of the National Historic Preservation Act of 1966, a Clean Water Act (CWA) Section 404 General Permit and a Rivers and Harbors Act Section 10 Individual Permit from the U.S. Army Corps of Engineers (ACOE), review in accordance with the U.S. Endangered Species Act (ESA) by the U.S. Fish and Wildlife Services (USFWS), and a National Pollutant Discharge Elimination System Construction General Permit (NPDES CGP) from the United States Environmental Protection Agency (EPA).

Because the project requires DPU approval, subject matter jurisdiction is functionally equivalent to full scope jurisdiction, in accordance with 301 CMR 11.01(2)(a)(3). Therefore, MEPA jurisdiction for this project is broad and extends to all aspects of the project that are likely, directly or indirectly, to cause Damage to the Environment as defined in the MEPA regulations.

Review of the DEIR

The DEIR includes a description of the proposed project and updated plans. The DEIR indicates that as the project design has progressed, the resulting impacts have been refined and generally minimized.

The DEIR provides a description and analysis of applicable statutory and regulatory standards and requirements, and a description of how the project will meet those standards. The DEIR includes a list of required State Agency Permits and approvals and provides an update on the status of each of these pending actions. The Proponent filed a Petition to Construct and applied for Zoning Exemptions with the DPU in April 2015. Given the key role federal ACOE permitting will play in the selection, scope and implementation of wetlands mitigation, the DEIR includes an update on the ACOE permitting process, including coordination efforts and anticipated compliance with regulatory and permitting standards and mitigation requirements. In addition, it summarizes consultation regarding potential impacts to archaeological resources.

The DEIR provides a description of other elements of the AC Plan, associated permitting and review requirements, and identifies permitting and construction schedules. The DEIR identifies the applicable standards that govern the required minimum distances between structures, transmission lines and related equipment, vegetation management requirements, and other design criteria to demonstrate that the project will avoid, minimize and mitigate Damage to the Environment.

Alternatives Analysis

The DEIR includes an analysis of various transmission line alternatives to meet the needs in the Merrimack Valley study area identified in the Greater Boston Area Needs Assessment including the following alternatives:

- No-Build Alternative;
- Configuration Alternatives;
- Overhead Transmission Routing Alternatives;
- Underground Transmission Routing Alternatives;
- Non-Transmission Alternatives (NTAs); and
- the Preferred Alternative.

The No-Build Alternative was rejected because it would not meet the project goal of improving reliability through relief of potential contingency overloads on elements of the transmission system serving the study area. The Proponent evaluated four potential alternatives for the reconfiguration of the existing lines and distribution circuits to accommodate the project. The reconfiguration alternatives would require the use of double circuit structures to support the new 3124 line; these would require extended power outages for their installation, be significantly taller than existing or proposed structures (potentially triggering Federal Aviation Administration permitting), and introduce the possibility that two circuits could be lost concurrently during the same event.

The Proponent assessed two overhead alternatives on the basis of cost, potential for environmental impact, and reliability: the Preferred Alternative and the Seabrook-Ward Hill Alternative. The Seabrook-Ward Hill Alternative would consist of a new 345-kV transmission line between the Seabrook Substation in Seabrook, New Hampshire, and the Ward Hill Substation in Haverhill. Both alternatives would meet the identified need; however, the Seabrook-Ward Hill Alternative would require more extensive relocation of existing lines, significant new ROW acquisition, and a separate undertaking to reconduct the Y-151 Line. This alternative is significantly more expensive, more complex to construct, and would increase environmental impacts.

The Proponent considered three conceptual routes for the underground transmission routing alternatives: the existing project ROW; a route using the Interstate 93 (I-93) and I-495 corridors; and an in-road route along Route 38 in Massachusetts and Routes 128, 102, and 28 in New Hampshire (Preferred Underground Alternative). Although the Preferred Underground Alternative would reduce impacts compared to the Preferred Alternative, it would have greater construction period impacts, would not meet the identified need due to significant load imbalances that could result in thermal overloads on the underground cable, and would be significantly more expensive to construct.

In addition to studying transmission routes, the Proponent evaluated the potential of NTAs such as new generation, energy efficiency, demand response programs, distributed generation, and storage to meet the identified need within the load area. The Proponent asserts that, in comparison with the Preferred Alternative, NTAs would likely create more environmental impacts, be significantly more costly, be difficult to implement, and be less flexible and robust in operation. The DEIR does not include an analysis of the implementation of NTAs in combination with a scaled-back transmission project as directed by the Scope for the DEIR.

Land Alteration

The DEIR indicates that land use impacts will be minimal because the project is proposed to be located within the existing ROW. The project does not propose the expansion of the ROW. In most locations, the ROW has been cleared to nearly its full extent. The DEIR indicates that there are limited locations along the project corridor that will require tree removal along the edge of the ROW. The DEIR includes plans depicting the locations of proposed tree removal within wetland resource areas and uplands. The Proponent has developed and adopted an Environmental Guidance document (EG-303NE) that describes environmental procedures and best management practices (BMPs) to support work in compliance with applicable regulations and company policies and procedures. The Proponent maintains upland and wetland areas within the ROW in accordance with its Vegetation Management Plan (VMP).

The DEIR indicates that while areas of existing invasive vegetation were mapped during the wetland delineation process, these areas will not be removed. Swamp mats and equipment will be cleaned prior to moving them from these areas. Invasive vegetation encountered post-construction will be left in place if too large, entirely removed by hand, or sprayed with an herbicide.

The DEIR characterizes the type of land clearing proposed. Trees will be cut close to the ground, leaving the stumps and roots in place, except where grading is required for access improvements or structure installation. Where swamp mats will be used, they will be placed on top of brush rather than removing the vegetation. At waterways, vegetation along banks will be selectively cut to minimize the disturbance of soil and potential for construction-related erosion. Brush, limbs, and cleared trees will either be chipped and removed off-site or left in place. In wetlands, felled trees and snags may be left in place to decompose in place to avoid disturbing soils and provide wildlife habitat. Wildlife enhancements of the resource areas, such as seeding, planting of native shrubs, and the addition of snags, woody debris, and stone piles may be proposed as mitigation for important wildlife features that may be lost as a result of tree and shrub removal. Upon completion of construction, unauthorized access will be restricted by the installation of gates and/or barriers at entrances from public roads (where approved by property owners).

The DEIR describes the Proponent's comprehensive public outreach protocol for notifying municipalities and property owners about proposed tree clearing along the ROW. The protocol includes sending abutters fact sheets, holding community meetings, a project website hotline/email, and a construction communication plan.

Wetlands

The project corridor includes wetland resource areas and activities that trigger federal, State, and local wetland permitting jurisdiction, each with its own performance standards and regulations. The Tewksbury, Andover, and Dracut Conservation Commissions will review the project to determine its consistency with the Limited Project provisions (310 CMR 10.53(3)(d)) of the Wetlands Protection Act (WPA), the Wetlands Regulations (310 CMR 10.00), and associated performance standards, including the stormwater management standards (SMS).

MassDEP will review the project to determine its consistency with the c. 91 regulations (310 CMR 9.00) and the 401 WQC regulations (314 CMR 9.00) which incorporate the SMS. Finally, ACOE will review the project to determine its consistency with Section 404 of the federal CWA. The project will cross 29 wetland systems and 10 intermittent and perennial streams in Massachusetts. Wetland resource areas include BVW, Bank, Riverfront Area, BLSF, and LUWW. The ROW also includes two certified vernal pools.

Project construction will result in unavoidable impacts to wetland resources within the project ROW that will include: temporary disturbance caused by the placement of timber mats for construction access; conversion of forested wetlands to either scrub/shrub or emergent wetland types; and permanent fill associated with the placement of structures and construction of access road improvements. As previously noted herein, the ENF provided an estimate of permanent and temporary wetland impacts associated with the project. The Scope on the DEIR required the Proponent to provide additional analysis of the project's impacts on wetlands, describe proposed measures to avoid and minimize those impacts, and disclose associated mitigation for unavoidable impacts. The DEIR does not fully respond to the Scope regarding impacts to wetlands. It does indicate that the wetlands have been delineated but does not quantify wetland resource areas in the project ROW or estimate impacts to resource areas as required by the Scope. In addition, it does not describe the extent of tree removal and conversion. It identifies mitigation measures which, in some cases, are quite general, and identifies how impacts have been minimized. I expect that the Proponent will comprehensively address these issues in the FEIR.

The DEIR indicates that wetlands were delineated in accordance with ACOE and MassDEP policies, and local wetland bylaw procedures. Refinements to the project design will minimize tree clearing, habitat, and wetland impacts. The project will avoid direct wetland impacts by using existing access roads and routing new access ways, and by relocating and/or resizing structures, work sites, and pull sites wherever possible. This includes relocating three proposed structures, eliminating one proposed structure, and shifting work pads in nine locations. Construction impacts will be minimized using a variety of BMPs, including swamp mats, erosion and sedimentation control barriers, erosion control blankets, hyrdoseeding, turbidity controls, dewatering basins, and construction signage. Temporary mitigation from construction will be mitigated through in-situ restoration. Throughout the construction process, the Proponent will retain the services of an environmental monitor to ensure compliance with all permit requirements and policies.

According to the DEIR, the Proponent will coordinate with ACOE, MassDEP, and local Conservations Commissions to develop a comprehensive mitigation plan to address the compensatory mitigation that will be required for unavoidable impacts in accordance with the provisions of the applicable regulations. The DEIR indicates that compensation for permanent impacts will be provided at a 2:1 ratio to meet federal, state, and local regulatory requirements. Mitigation for secondary impacts could include restoration, preservation, and/or in-lieu fee payment(s).

The Proponent intends to construct the project in compliance with the Wetlands Regulations and associated SMS. The Proponent will prepare a Stormwater Pollution Prevention

Plan (SWPP) in accordance with its NPDES CGP. As previously mentioned, an environmental monitor will be on-site throughout the construction process to ensure compliance with all permit requirements.

Chapter 91

The project involves construction of the new 3124 Line and relocation of the existing N214 Line over the Merrimack River within the existing ROW, which may require authorization through a c.91 License. According to the DEIR, only the conductors and shield wire associated with the circuits are within c. 91 jurisdiction; no new structures located within the jurisdictional area or in-water work is proposed. The new crossing will be located within the ROW of existing licensed crossings. The new crossing will be at the same or greater height than the existing crossings and will not restrict or impair access to or navigation upon the Merrimack River. The Proponent will consult with MassDEP to confirm that the work may be completed as a minor modification to an existing c. 91 license.

Rare Species

Portions of the project site are located within mapped *Priority and Estimated Habitat* for several state-listed rare species. The project ROW contains habitat for bald eagles (federally protected) and a dragonfly in Tewksbury and Andover and habitat for a turtle and a salamander in Dracut. There are no rare plants along the project corridor within Massachusetts. The project will require MESA review by NHESP. The Proponent has been consulting with NHESP to avoid and minimize impacts to state-listed species and their habitats. According to the DEIR, during consultation in April 2015, NHESP indicated that further surveys would not be necessary.

Comments from NHESP indicate that the project can be conditioned to avoid a "take" of state-listed species through the implementation of construction conditions and BMPs such as time-of-year restrictions, restoration of temporarily disturbed areas, and further refinement of work zones. According to the DEIR, the Proponent may also be required to implement a turtle protection plan.

The DEIR indicates that the project corridor also contains potential habitat for a federally-listed species pursuant to the ESA. Based on consultation with USFWS, the Proponent will conduct surveys for the listed species. If the listed species is not found, USFWS may issue a determination that the project "may affect, but is not likely to adversely affect" the species. The Proponent commits to continuing consultation with NHESP and USFWS to avoid and minimize impacts to rare species.

Traffic and Transportation

The project will require a Non-Vehicular Access Permit from MassDOT for proposed aerial crossing of I-495 by the 3124 Line and the relocation of the N214 Line at the same location. The project ROW will include 12 road crossings. Potential traffic impacts did not warrant additional traffic studies in the DEIR; however, the DEIR includes a commitment to prepare a Traffic Management Plan (TMP) to maintain safe and efficient access for all modes of travel in the vicinity of access points to the ROW. The TMP should incorporate the content provided in the MassDOT comment letter on the ENF. Review and approval of the TMP will occur in conjunction with the MassDOT permitting process. The Proponent and MassDOT should coordinate appropriate times, length and management of roadway shutdowns to limit impacts to travelers. The Proponent will coordinate with local authorities for work on local streets and roadways.

Greenhouse Gas Emissions

I determined that this project qualifies for the de minimus exemption of the MEPA GHG Policy; therefore, the Proponent was not required to prepare a GHG analysis in the DEIR. The Proponent will incorporate measures to avoid and minimize GHG emissions (and other air pollutants) during the construction period through the use of emissions-reduction technologies.

Historic and Archaeological Resources

MHC's Massachusetts Cultural Resource Information System (MACRIS) database lists four pre-contact archaeological sites that are located within the ROW between Andover Street in Tewksbury and the Merrimack River. The Proponent identified the four sites during an intensive archaeological survey for the Y-151 Transmission Line. The Proponent anticipates that it can avoid any impacts to these areas. There are no historical properties within the ROW or the survey corridor.

The project is subject to review under Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800) and by MHC in compliance with M.G.L. c.9 ss.26-27C as amended by Chapter 254 of the Acts of 1988. MHC review will be undertaken concurrently with Section 106 Review through consultation with the ACOE. As part of Section 106 consultation for the Section 404 permit, MHC submitted a letter to the ACOE which requested that the Proponent conduct an intensive (locational) archaeological survey for a number of potential archaeologically sensitive portions of the project corridor that have not been previously and sufficiently tested. On behalf of the Proponent, the Public Archaeology Laboratory (PAL) conducted an intensive archaeological survey in July 2015 within ACOE permit areas that were not previously tested. The testing resulted in two isolated projectile point finds and one small archaeological site, which have limited research potential and are not recommended as potentially eligible for listing in the National Register; no further investigation is recommended. The Proponent will submit a final report to MHC.

According to the DEIR, as part of its Section 404 permit review, ACOE will also consult with Native American tribes that express an interest in the historic and archaeological resources that may be affected by the project within ACOE jurisdiction. In addition, notification letters and permit area plans were also furnished to the Tribal Historic Preservation Officers of the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah); no comments were received. The Proponent will continue to coordinate with ACOE and MHC to determine the location and scope of any additional archaeological surveys, and if any properties eligible for listing in the National Register are discovered, to assess potential effects and develop avoidance and minimization measures of adverse effects to any eligible historic and archaeological resources.

Construction Period

The project must comply with MassDEP's Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. c.40, s.54. The Proponent must obtain a U.S. EPA's NPDES CGP and prepare a Stormwater Pollution Prevention Plan (SWPPP).

The DEIR includes plans that depict proposed primary and alternate access routes, existing and proposed structures and poles, ROW boundaries, delineated and estimated wetland boundaries, construction work pads, pull pad sites, swamp mat construction work pad, timber mat access, laydown areas, erosion controls, and tree clearing areas. The DEIR indicates that conventional overhead electric transmission line construction techniques will be used to construct the 3124 Line and to complete associated line reconfigurations. These activities include: removal of vegetation and ROW mowing in advance of construction; installation of erosion and sedimentation controls; access improvement and maintenance; installation of foundations and structures; installation of conductor and shield wire; removal of existing transmission line components; and restoration of the ROW.

The DEIR briefly discusses the use of low ground pressure (LGP) equipment as a method that may be used where wetland impacts are unavoidable. While such equipment may be used to facilitate crew access and transport of smaller materials, equipment typically used for construction usually exceeds the threshold.

Although the plans depict primary and alternate access routes, they do not identify whether the access route will be permanent or temporary (i.e., construction period only). The DEIR indicates that existing access routes may require maintenance and improvements to facilitate equipment movement, including the placement of gravel or trap rock to provide a level surface within the access route. The DEIR discusses how those roadways that will be temporary in nature will be restored to original conditions subsequent to the construction period. All project-related temporary construction access ways (including those outside wetland areas) will be restored.

Conclusion

Based on a review of the DEIR, the Scope included in the NPC Certificate, comment letters and consultation with State Agencies, I have determined that the DEIR adequately and properly complies with MEPA and its implementing regulations. The Proponent should prepare the FEIR consistent with the Scope included below.

SCOPE

General

The FEIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by this scope. The FEIR should identify any changes to the project since filing of the DEIR and review the project's compliance with applicable regulatory standards. The primary emphasis of this Scope is on addressing information and analysis of land alteration and wetlands that was not provided in the DEIR. I expect that the FEIR will be responsive to the Scope below. If it is not, a Supplemental FEIR may be required.

Land Alteration

The FEIR should describe the extent of tree removal and conversion. Tree clearing and other vegetation removal should be clearly described and identified on project plans and the type and extent of restoration efforts should be described and identified.

Wetlands and Stormwater

It is unclear why wetlands impacts were not quantified in DEIR narrative given the level of design achieved at this point. The FEIR should quantify existing wetland resource areas in the project ROW and estimate project-related impacts to each resource area. The FEIR should describe the extent of tree removal/conversion of forested wetland to shrub/scrub or emergent wetland. The FEIR should summarize the impacts by resource area and by municipality and provide detailed information on mitigation measures for each resource area.

The FEIR should quantify the potential amount of permanent BVW impacts and temporary wetland alteration, identify proposed wetland replication areas, and demonstrate compliance with 401 WQC standards at 314 CMR 9.06 that require the project to avoid, minimize, and mitigate the placement of fill in BVW. The Proponent should review the MassDEP *Inland Wetlands Replication Guidance* document to assist in the design of wetland replication areas, if required. The FEIR should specifically discuss how the locations of replacement or new utility structures were determined to balance maximum wetland avoidance and engineering requirements of utility pole span and conductor clearance. If applicable, the FEIR should include the results of a Wildlife Habitat Evaluation completed pursuant to the WPA regulations (310 CMR 10.60) and the procedures and methods detailed in MassDEP's *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands*.

The FEIR should identify the project's impacts to wetland resource areas (i.e. associated with use of swamp mats and general construction activities) that will be subject to ACOE review. ACOE regulations and guidance categorize wetland impacts as either permanent (fill), temporary (disturbance), or secondary. The FEIR should identify applicable ACOE performance standards and regulations to assist in determining the potential overlap or conflict with State wetland permitting requirements. The FEIR should include narrative and supporting data or graphics as necessary to demonstrate that the project can meet all applicable performance standards and regulations. If these standards and regulations cannot be met, the FEIR should describe how construction of the project may otherwise proceed (i.e., a variance, etc.). The FEIR should summarize the content and results of coordination meetings with various regulatory agencies and stakeholders undertaken since the filing of the DEIR.

The FEIR should discuss how the use of swamp mats will be effectively managed to limit permanent impacts to wetland resource areas. The FEIR should describe how construction sequencing will be conducted to minimize impacts to wetland resource areas. The FEIR should describe potential monitoring and mitigation (i.e., supplemental plantings, regrading, etc.) efforts to ensure that wetlands will not be permanently impacted and to limit the likelihood of repopulation with invasive species. Any proposed mitigation program should include a discussion of how the Proponent will restore pre-construction grades and natural wetland vegetation. The FEIR should consider provision of vegetative buffers at roadway crossings.

The FEIR should address comments from MassDEP including: additional mitigation; confirmation of a minimum mitigation for all permanent impacts; discussion of mitigation for temporary impacts with secondary effects; clarification of how the construction work and impacts in pull pad sites will differ from the impact on construction work pads and how the deployment of these pads would impact wetland resources; and confirmation that swamp mats will be deployed within the timeframes specified in the March 2015 PGP promulgated by ACOE.

In summary, the FEIR should demonstrate that the project will avoid, minimize or mitigate wetland resource area impacts to the maximum extent practicable. The FEIR should clearly outline a comprehensive wetland mitigation program that meets ACOE, MassDEP, and local bylaw requirements and performance standards. This mitigation program should include construction period measures, post-construction period monitoring and restoration, and measures to promote wildlife habitat and prevent the establishment of invasive species.

The FEIR should evaluate impacts from stormwater runoff during construction and post-construction. It should demonstrate that source controls, pollution prevention measures, erosion and sedimentation control measures, and any required post-construction drainage system will be designed in compliance with MassDEP Stormwater Management Regulations. The FEIR should consider use of low impact development (LID) measures and integrated management practices (IMP), if applicable to the project.

Chapter 91

Comments from the MassDEP Waterways Regulation Program (WRP) indicate that it has determined that the proposed project is an infrastructure crossing facility pursuant to 310 CMR 9.02. 310 CMR 9.12(2)(d) states:

"In the case of an infrastructure crossing facility, or any ancillary facility thereto, for which an EIR is submitted, the Department shall find such facility to be water-dependent only if the Secretary has determined that such facility cannot reasonably be located or operated away from tidal or inland waters, based on a comprehensive analysis of alternatives and other information analyzing measures that can be taken to avoid or minimize adverse impacts on the environment, in accordance with M.G.L. c. 30, §§ 61 through 62H."

WRP indicates that it considers the project to be water-dependent but will make its formal determination in accordance with 310 CMR 9.12(2)(d). Based on review of the alternatives analysis presented in the DEIR, I find that the facility cannot reasonably be located or operated away from the Merrimack River. Therefore, I concur that this project is water-dependent. The Proponent should consult with the WRP prior to filing a Waterways License application to determine the extent of work within c. 91 jurisdiction. The FEIR should provide an update on the project's compliance in accordance with the c.91 regulations and consultation with WRP.

Rare Species

The FEIR should include the turtle protection plan or explain how the plan will be sufficient to satisfy the requirements for a no "take" determination from NHESP. The FEIR should describe measures to avoid, minimize and mitigate impacts to rare species habitat, including adjusting work zones to avoid locations with species, time of year restrictions, and restoration. The FEIR should provide an update on the USFWS determination for the federally-listed species. The FEIR should provide an update on consultations with NHESP and USFWS.

Mitigation and Section 61 Findings

The FEIR should include an updated and revised chapter that summarizes proposed mitigation measures and provides individual draft Section 61 Findings for each State Agency that will issue permits for the project. The FEIR should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation.

Responses to Comments/Circulation

The FEIR should contain a copy of this Certificate and of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the FEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the FEIR beyond what has been expressly identified in this certificate. The Proponent may use either an indexed response to comments format, or a direct narrative response.

In accordance with Section 11.16 of the MEPA Regulations and as modified by this Certificate, the Proponent should circulate a hard copy of the FEIR to each State and City Agency from which the Proponent will seek permits or approvals. The Proponent must circulate a copy of the FEIR to all other parties that submitted individual written comments. Per 301 CMR 11.16(5), the Proponent may circulate copies of the FEIR to these other parties in CD-ROM format or by directing commenters to a project website address. However, the Proponent should make available a reasonable number of hard copies to accommodate those without convenient access to a computer and distribute these upon request on a first-come, first-served basis. The Proponent should send correspondence accompanying the CD-ROM or website address indicating that hard copies are available upon request, noting relevant comment deadlines, and appropriate addresses for submission of comments. A CD-ROM copy of the filing should also be provided to the MEPA Office. A copy of the FEIR should be made available for review at the Tewksbury, Andover, and Dracut public libraries.

October 16, 2015
Date

Matthew A. Beaton

Comments received:

10/08/2015	Massachusetts Department of Environmental Protection – Northeast Regional Office (MassDEP NERO)
10/09/2015	Massachusetts Division of Fisheries and Wildlife – Natural Heritage and Endangered Species Program (NHESP)
10/09/2015	Northern Middle Council of Governments (NMCOG)

MAB/PPP/ppp

MassDEP
Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

October 9, 2015

Matthew A. Beaton, Secretary
Executive Office of
Energy & Environmental Affairs
100 Cambridge Street
Boston MA, 02114

RE: Tewksbury, Andover, Dracut
Merrimack Valley Reliability Project
The Fifteen Mile Falls Right-of-Way
EEA # 15289

Attn: MEPA Unit

Dear Secretary Beaton:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the Draft Environmental Impact Report (DEIR) submitted by New England Power Company d/b/a National Grid to construct a new 345 kV electric transmission line for a distance of 24.4 miles within an existing right-of-way (ROW) between the Tewksbury 22/22A Substation and the Public Service Company of New Hampshire-owned Scobie Pond Substation in Londonderry, New Hampshire (The Fifteen Mile Falls ROW). The project will require about 1.35 acres of additional clearing in discrete locations over the 6.5 mile, variable width (350-feet to 520-feet) ROW within the Massachusetts towns of Tewksbury, Andover, and Dracut (EEA #15283). A total of 184 structures are proposed. The structures will increase in height from 35-95 feet to 45-115 feet, including about four structures at 115 feet. The project also includes reconductoring of the Y151 line within the ROW (1.7 miles in Massachusetts and 7.7 miles in New Hampshire). Higher capacity conductors will replace a transmission line from north of Wheeler Road in Dracut to Hudson, New Hampshire.

The proposed line is reported to be needed to "(r)elieve potential contingency overloads under various conditions on several elements of the transmissions system." This project is one of 40 transmission projects in ISO-New England's AC Plan in the *Greater Boston Solutions Study* for an area serving southern New Hampshire and northern Massachusetts. An updated needs assessment, (January 2015) indicated that there is an immediate need for increased capacity in this area to address thermal overloads and provide a reliable source of electricity. MassDEP provides the following comments.

Wetlands

In Massachusetts, the project will span 29 wetland resource areas, nine streams, and the Merrimack River. There also are two certified vernal pools in this ROW segment, as well as priority and estimated habitat for species protected under the Natural Heritage and Endangered Species (NHESP) program. As reported in the DEIR, most of the right-of-way (ROW) is cleared and maintained. As a result, additional tree and vegetation removal will be needed for this project in only a few locations.

Project-related impacts will result from construction work, as well as placement of structures and fill within wetland resource areas. Forested wetlands may be converted to shrub/scrub or emergent wetland resources. The proponent is proposing the wetlands alterations under the Limited Project provisions in 310 CMR 10.53(3)(d), which allows construction, reconstruction, operation, and maintenance of public utilities for projects that comply with the conditions in the applicable regulations, including consideration of reasonable alternative routes, the use of best management practices (BMPs) for construction impacts and restoration of surface vegetation and land contours.

The DEIR reports that refinements to the project design minimize tree clearing, habitat, and wetland impacts to the greatest extent practicable, and it appears that wetlands impacts have been reduced since the Environmental Notification Form review by relocating three utility structures, eliminating one structure, and shifting work pads in nine locations (page 124). Access along the ROW from four wetland areas also has been eliminated from the construction plan. However, the wetland resource impacts are not quantified or described in detail in the DEIR. The extent of tree removal and conversion of forested wetland to shrub/scrub or emergent wetland has not been established, and the impacts within each affected town are not explained. The FEIR should provide this basic, wetland impact information to show that the changes are in accordance with the requirements for wetlands permitting and 401 Water Quality Certification. Conversion of wetland type can have significant impacts beginning with construction work and over time. As additional mitigation measures may be needed, this issue should be addressed in greater detail in the FEIR.

The wetland resources and areas of wetlands alterations are depicted in 29 plan sheets that span the project ROW in Massachusetts (Appendix D). This detailed plan set includes the areal measurements of permanent wetland impacts for the poles required to support the utility lines. The swamp mat and timber mat construction work areas and tree removal areas also are depicted. Given the level of design at this point, it is not clear why wetlands impacts were not quantified further in the DEIR. MassDEP staff used those plans, for example, to estimate that permanent wetlands impacts for pole installation would be 924 square feet in Tewksbury and 475 square feet in Dracut. In addition, the plans, (e.g., page 6 of 29) include areas labeled as pull pad sites (100 feet x 300 feet). The narrative is unclear how the construction work and impacts in pull pad sites differ from the impacts on construction work pads; and in particular, how the deployment of these pads would impact wetlands resources. Information to address this issue should be provided in the FEIR narrative, including a description of the secondary impacts to wetland resources.

There are two areas within the ROW that are mapped as Priority and Estimated Habitats for state listed rate, threatened, and endangered species (PH 1321/EH 65 and PH678/EH 636. A new transmission line with new structures, more than 200 feet away from the banks of the Merrimack River will be located in an area of Tewksbury and Andover that is habitat for bald eagles and a dragonfly. Six new structures, removal of three structures, and conductor work are proposed within the protected reptile habitat in Dracut. The DEIR reported discussions with the NHESP indicate that it may be possible to avoid a "take" of rare species with a reptile protection plan. The FEIR should address this issue in greater detail to confirm that a protection plan will be sufficient to satisfy NHESP requirements. To the extent feasible, this plan also should be provided or explained.

The EIR indicates that wetlands replication is proposed at a ratio of at least 1:1. It also is reported that the US Army Corps of Engineers (USACE) may require mitigation for secondary impacts that could include restoration, preservation, and/or a fee in lieu of mitigation. Wetlands mitigation adheres to the General Conditions of the General Permit required under Section 404 of the federal Clean Water Act, which is administered by the USACE (page 59). The DEIR indicates that compensatory mitigation will be required for permanent wetlands impacts that exceed 5,000 sf. In fact, mitigation is required for all permanent impacts, including those under this threshold. Mitigation also may be required for temporary impacts with secondary effects, and is more likely to be required in areas of cutting and tree clearing than areas where mats are used. Wildlife enhancements of the resource areas, such as seeding, planting of native shrubs, and the addition of snags, woody debris, and rocks may be installed where tree and shrub removal is needed (page 47). Erosion and sedimentation controls also will be deployed in areas where land clearing is required.

Construction impact mitigation

To minimize damage to wetland resource areas, swamp mats will be used to support construction equipment, and stream crossings will comply with the applicable sections of the Massachusetts River and Stream Crossing Standards. MassDEP requests confirmation in the FEIR that the mats will be deployed within the timeframes specified in the March 2015 Programmatic General Permit promulgated by the USACE.

The proponent has BMPs that contractors must adhere to, in order to minimize additional construction-related wetlands impacts. These BMPS are described in the *National Grid Environmental Guidance: Access, Maintenance and Construction Best Management Practices (EG303-NE)* (Appendix G). As also explained in the DEIR, best management practices and equipment maintenance reduces the potential for accidental releases of petroleum products into the wetlands. With the exception of equipment that is not mobile, all material storage, equipment, and refueling will only be permitted beyond 100-feet of the wetland resource. Typically, developed areas such as parking lots and existing contractor yards are used for staging construction equipment and materials. In addition, a Storm Water Pollution Prevention Plan will be prepared and submitted to USEPA for compliance with the National Pollutant Discharge Elimination System Construction General Permit.

In addition, the proponent will contract with an environmental monitor to ensure compliance with all permit requirements and policies. The contractor also will have responsibility to inspect the construction work and maintenance of environmental controls.

401 Water Quality Certificate

The DEIR acknowledges that regulations for the 401 Water Quality Certification require wetlands replication at a rate of at least 1:1 for bordering and isolated vegetated wetlands and land under water. It also is reported in the response to comments from MassDEP that replication would be provided at a 2:1 ratio; replication is being considered in Tewksbury and Dracut. Since there are no details on the wetland mitigation, this information is requested in the FEIR.

Waterways, Chapter 91

Chapter 91 Jurisdiction

A portion of the proposed work includes the relocation of one aerial transmission line (Line N-214) and construction and maintenance of a new aerial transmission line (Line 397) crossing over the Merrimack River (non-tidal portion), from Andover, Essex County to Dracut, Middlesex County, which may require authorization through a Chapter 91 Waterways License.

Water Dependency

The Department has determined that the proposed project is an infrastructure crossing facility as defined in 310 CMR 9.02. Infrastructure crossing facilities may be found to be either water-dependent or nonwater-dependent. Pursuant to 310 CMR 9.12(2)(d), because the project required an EIR, the Waterways Regulation Program (WRP) shall find such facility to be water-dependent only if the Secretary has determined that such facility cannot reasonably be located or operated away from inland or tidal waters, based on a comprehensive analysis of alternatives and other information analyzing measures that can be taken to avoid or minimize adverse impacts on the environment, in accordance with M.G.L. c.30 s.61 through 62H and 310 CMR 9.12(2)(d). In the event that the project is determined to be nonwater-dependent, the standards at 310 CMR 9.55 for nonwater-dependent infrastructure facilities shall apply. The WRP believes that the project is water-dependent but will make its formal determination in accordance with 310 CMR 9.12(2)(d) when a Waterways License application has been received.

WRP Comments

The Department recommends that the proponent arrange a pre-application meeting with the WRP prior to filing a Waterways License application to better understand the extent of work occurring within Chapter 91 jurisdiction.

The MassDEP appreciates the opportunity to comment on this proposed project. Please contact Phil.Dipietro@state.ma.us at (978) 694-3251 for further information on the wetland issues or questions regarding the WRP's comments, please feel free to contact Frank.Taormina@state.ma.us, at (617) 292-5551. If you have any general questions regarding these comments, please contact Nancy.Baker@state.ma.us, MEPA Review Coordinator at (978) 694-3338.

Sincerely,

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission
Frank Taormina, MassDEP-Boston
Rachel Freed, Phil DiPietro, Heidi Davis MassDEP-NERO
Conservation Commissions, Town of Tewksbury, Andover, Dracut

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Jack Buckley, *Director*

October 9, 2015

Secretary Matthew A. Beaton
Executive Office of Environmental Affairs
Attention: MEPA Office, Purvi Patel, EEA No. 15283
100 Cambridge St.
Boston, Massachusetts 02114

Project Name:	Merrimack Valley Reliability Project
Proponent:	New England Power Company d/b/a National Grid
Location:	Tewksbury, Andover, and Dracut
Document Reviewed:	Draft Environmental Impact Report (DEIR)
Project Description:	construction of a new 345kV transmission line
EEA No.:	15283
NHESP Tracking No.	14-33909

Dear Secretary Beaton:

The Natural Heritage & Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries & Wildlife (Division) has reviewed the Draft Environmental Impact Report (DEIR) for the Merrimack Valley Reliability Project and would like to offer the following comments.

Portions of the proposed project located within *Priority Habitat* and *Estimated Habitat* as indicated in the 13th Edition of the *MA Natural Heritage Atlas* and therefore the project requires review through a direct filing with Division for compliance with the Massachusetts Endangered Species Act (MESA, MGL c.131A) and its implementing regulations (321 CMR 10.00). Review of the NHESP database indicates that the proposed project will occur within the habitat of both invertebrate and vertebrate species which are state-listed and protected in accordance with the MESA.

In anticipation of filing the proposed project for compliance with the MESA, the project proponent has been consulting with the Division to reduce the impacts of the proposed project to state-listed species and their habitats. Based on the most recent consultations and the information provided in the DEIR, the Division believes that the proposed project could avoid a "take" of state-listed species with the implementation of certain construction conditions and best management practices such as time of year restrictions, restoration of temporarily disturbed areas, and further refinement of work zones. The Division will not render a final decision until the MEPA review process and associated public and agency comment period is completed, and until all required MESA filing materials are submitted by the proponent to the Division. As our MESA review is ongoing, no alteration to the soil, surface, or vegetation and no work associated with the proposed project shall occur on the property until the Division has made a final determination. We look forward to continued careful coordination with the proponent on the details of the project design and implementation. If you have any questions or need additional information, please contact Eve Schlüter, Ph.D., Chief of Regulatory Review at (508) 389-6346 or eve.schluter@state.ma.us.

www.mass.gov/nhesp

Division of Fisheries and Wildlife
Field Headquarters, 1 Rabbit Hill Road, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7890
An Agency of the Department of Fish and Game

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

cc: Tim Sullivan, Vanasse Hangen Brustlin, Inc.
Andover Board of Selectmen
Andover Conservation Commission
Andover Planning Department
Dracut Board of Selectmen
Dracut Conservation Commission
Dracut Planning Department
Tewksbury Board of Selectmen
Tewksbury Conservation Commission
Tewksbury Planning Department
DEP Northeastern Regional Office, MEPA Coordinator

Northern Middlesex Council of Governments

A Multi-Disciplinary
Regional Planning
Agency Serving:

Billerica
Chelmsford
Dracut
Dunstable
Lowell
Pepperell
Tewksbury
Tyngsborough
Westford

Philippe Thibault
Chair

Beverly A. Woods
Executive Director

40 Church Street
Suite 200
Lowell, MA
01852-2686

TEL: (978) 454-8021

FAX: (978) 454-8023

www.nmcog.org

October 9, 2015

Matthew Beaton, Secretary
Executive Office of Energy and Environmental Affairs
Attention: MEPA Office
Purvi Patel; EOEEA #15283
100 Cambridge Street; Suite 900
Boston, MA 02114-2509

RE: EOEEA #15283/NMCOG #642 – Merrimack Valley Reliability Project, Tewksbury, Andover and Dracut

Dear Secretary Beaton:

The Northern Middlesex Council of Governments (NMCOG) has reviewed the Draft Environmental Impact Report (DEIR) for the proposed Merrimack Valley Reliability Project in Tewksbury, Andover and Dracut. The Project involves construction and interconnection of a new 345kV electric transmission line in an existing right-of-way (ROW) from Tewksbury, MA to Londonderry, NH. It also involves reconfiguration of several other existing lines within the ROW.

The new line is designed to improve transmission capacity in order to meet projected load requirements in southern New Hampshire and northeastern Massachusetts. In Massachusetts, the ROW passes through Andover, Dracut and Tewksbury adjacent to forested areas, wetlands, open fields, and a mix of commercial/industrial and residential areas. North of the Merrimack River in Dracut, portions of the Project ROW also pass through sand pits and gravel yards (both active and inactive) as well as six parcels of Protected or Recreational Open Space.

ENVIRONMENTAL IMPACTS

The Project will temporarily disturb 13.3 acres of wetlands, will convert 4.6 acres of forested wetlands to either scrub/shrub or emergent wetlands, and will permanently fill 2,600 square feet of wetlands. The ROW crosses two Natural Heritage and Endangered Species Program (NHESP) Priority Habitat parcels and four archaeological sites. It is located within habitat for a state-listed turtle, salamander, and dragonfly as well as the bald eagle. The project corridor also contains potential habitat for a federally-listed species.

The project exceeds the MEPA review threshold for altering one or more acres of bordering vegetated wetland. According to the Certificate issued December 24, 2014, the project *may* meet threshold 301 CMR 11.03(2)(b)(2), taking of an endangered or threatened species or species of special concern. This depends on the results of survey and consultation with NHESP and the US Fish and Wildlife Service.

PERMITS

The project is subject to the preparation of a Mandatory EIR pursuant to 301 CMR Section 11.03(3)(a)(l) of the MEPA regulations because it requires State Agency Actions and will alter one or more acres of BVW. The project will also require the following:

- A 401 Water Quality Certificate (401 WQC);
- A Chapter 91 License from the Massachusetts Department of Environmental Protection (MassDEP);
- A Non-Vehicular Access Permit from the Massachusetts Department of Transportation (MassDOT);
- A Petition to Construct and Zoning Exemptions from the Massachusetts DPU.
- An Orders of Conditions from the Tewksbury, Andover, and Dracut Conservation Commissions;
- Consultation with the Massachusetts Historical Commission (MHC);
- A Clean Water Act Section 404 Individual Permit from the US Army Corps of Engineers; and
- A National Pollutant Discharge Elimination System Construction General Permit from the United States Environmental Protection Agency (EPA).

Pending results from the field surveys, it may also require a Conservation and Management Permit (CMP) from the Natural Heritage and Endangered Species Program (NHESP). The project is subject to the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol.

PROPOSED MITIGATION

National Grid will consult with NHESP, USFWS the MHC and the US Army Corps of Engineers to assess sensitive areas to prevent a "take" of rare species, and a Reptile Protection Plan will be put into place to protect turtles along the Project Corridor.

Compensatory mitigation will be provided for all wetland impacts. The Project will comply with the Mass DEP Stormwater Management Policy, and a Storm Water Pollution Prevention Plan will be prepared prior to the start of construction. Surface contours, vegetation, soils, and other natural features will be maintained or restored to pre-work conditions. Best Management Practices (BMPs) will be employed to minimize erosion and other potential environmental impacts.

COMMENTS

NMCOG's comments are limited to the municipalities in our geographic jurisdiction, which include Tewksbury and Dracut.

Aesthetic Improvements in Tewksbury

The view shed in the area of Route 38/Main Street in Tewksbury is of particular importance because the Town is working with the Mass DOT and other State agencies to enhance the appearance of that area. The Proponent has committed to implementing an Aesthetics Improvement Plan for the area surrounding the #22A substation, in association with a different project. The Aesthetics Improvement Plan aims to:

- Upgrade the existing entrance to Power Company Road by expanding the curb radius to eliminate rutting and breaking of pavement, and to add landscaped islands to improve aesthetics.
- Improve the transmission line right-of-way northern entrance by adding a paved apron, stabilizing the gravel drive and replacing the barrier gate.
- Enhance the visual appeal along the south side of Route 38 by trimming existing growth and adding new plantings to buffer the wetlands and screen the transmission structure bases. Plantings under consideration include a variety of deciduous, evergreen and flowering plants.

We appreciate the creation of an Aesthetics Improvement Plan in association with NEP work at #22A Substation. The plan should specify that the view shed will not be degraded by the installation of new lines or the reconfiguration of old lines. In addition, National Grid should ensure the use of native vegetation and the use of pollinator-friendly species of flowering plants appropriate for the Eastern Broadleaf Forest Eco-Region[1]. This plan should be included with the Final Environmental Impact Report (FEIR).

Wetlands Buffer in Tewksbury

As stated in our ENF comments, a buffer should be installed and maintained at all roadway crossings and wetlands in the area of Route38/Main Street to enhance the visual aesthetics, while also filtering stormwater. In response to this comment, the Certificate issued on December 24, 2014, stated that the DEIR should "*include a discussion of providing a vegetative buffer at roadway crossings*". While the DEIR addresses the aesthetics of the area (see above), there is no discussion of buffers. The concept of adding a buffer should be discussed and incorporated into the Mitigation Chapter of the FEIR.

Recreation in Tewksbury

As stated in our ENF letter, Tewksbury is working to promote the accessibility of healthy activities such as bicycling, walking, hiking and running. In response to this comment, the Secretary's Certificate stated that the Proponent should consult with the Town of Tewksbury regarding opportunities for recreational use of the ROW. There is no indication that this consultation occurred. A discussion of the opportunities for recreation and use of the ROW should be included in the FEIR.

Protected and Recreational Open Space in Dracut

NMCOG has consulted with the Town of Dracut (Attachment 1). In Dracut, the ROW passes through six parcels that are designated as Protected or Recreational Open Space. In our ENF comment letter, we requested that each parcel be mapped, with disturbances clearly delineated, and with accompanying text describing impacts and mitigation. National Grid responded that disturbances will be "minimal" in this area, and that they do not believe the requested mapping will provide any additional benefit. NMCOG believes impacts to these open space parcels should be explained in a chapter/section called Open Space in the FEIR. Mitigation measures should also be described.

Rare Species in Dracut

The DEIR states that parcels PH678 and EH 636 in Andover and Dracut contain habitat for turtle and salamander species. The Proponent indicates they are consulting with NHESP and that a Reptile Protection Plan will be put in place to avoid a "take". The Reptile Protection Plan should be provided with the FEIR so that we may review and comment accordingly. NMCOG staff notes that salamanders are amphibians, not reptiles, therefore, the FEIR should describe any mitigation needed to protect the salamanders of concern.

Traffic Impacts

The Certificate indicates that the DEIR should include a commitment to prepare a Traffic Management Plan (TMP) to maintain safe and efficient access for all modes of travel in the vicinity of access points to the ROW. The TMP should be included with the FEIR so that there is opportunity for public review and comment.

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[1] http://pollinator.org/PDFs/Guides/EasternBroadleafOceanicrx20FINAL.pdf

Should you have any questions regarding the NMCOG staff comments please contact me directly at (978) 454-8021, extension 120.

Sincerely,

Beverly Woods

Beverly Woods
Executive Director

cc: Dracut and Tewksbury
Town Manager
Board of Selectmen
Planning Board
Planning Director
Town Engineer
Conservation Commission
Board of Health
NMCOG Councilors

National Grid

Attachment

Request for MEPA Review Comments

Distributed to: Dracut and Tewksbury-Town Manager, Board of Selectmen, Planning Board, Town Planner/Community Development Director, Town Engineer, Public Works Director/Highway Superintendent, Conservation Commission, Board of Health and NMCOG Councilors

In accordance with the Massachusetts Environmental Policy Act (MEPA) and its corresponding regulations, the Northern Middlesex Council of Governments (NMCOG) has received a *Draft Environmental Impact Report (DEIR)* for the following project:

The Merrimack Valley Reliability Project: In November 2014, New England Power Company, d/b/a National Grid, released an ENF for the Merrimack Valley Reliability Project. The Secretary of Energy and Environmental Affairs issued a certificate on December 24, 2014, which required the completion of a DEIR. The DEIR contains additional details about the project's impacts and proposed mitigation techniques. The project involves construction and interconnection of a new 345kV electric transmission line in an existing right-of-way (ROW) from Tewksbury, MA to Londonderry, NH. Existing lines within the ROW will also be reconfigured. This new line is designed to relieve potential contingency overloads. In Massachusetts, the ROW passes through Andover, Dracut and Tewksbury adjacent to forested areas, wetlands, open fields, and a mix of commercial/industrial and residential areas. North of the Merrimack River in Dracut, portions of the Project ROW also pass through sand pits and gravel yards (both active and inactive) as well as six parcels of Protected or Recreational Open Space.

Impacts: The project exceeds the MEPA review threshold for altering one or more acre of bordering vegetated wetland. The Project will temporarily disturb 13.3 acres of wetlands, will convert 4.6 acres of forested wetlands to either scrub/shrub or emergent wetlands, and will permanently fill 2,600 square feet of wetlands. Compensatory mitigation will be provided for these impacts. The ROW crosses two NHESP Priority Habitat parcels (PH 1321/ EH 6S and PH 678/ EH 636), and National Grid will be consulting with NHESP to discuss requirements to assess these areas and mitigate any potential impacts. There are four archaeological sites in the Project ROW between Andover Street in Tewksbury and the Merrimack River (19-ES-861, 19-ES-862, 19-ES-863, 19-ES-864), and National Grid will consult with the MHC and the US Army Corps of Engineers to determine whether any further survey is recommended. The Project will comply with the MADEP Stormwater Management Policy. Best Management Practices (BMPs) will be employed to minimize erosion and other potential environmental impacts.

Comments pertaining to the potential extent and significance of environmental impacts directly attributable to this project are most welcome. If you wish to comment, please do so in the comment section below. For additional information, please contact NMCOG staff at (978) 454-8021.

COMMENTS DUE AT MEPA NO LATER THAN: **Friday, October 9, 2015**

EOEEA/NMCOG REVIEW NUMBER: EOEEA #15283/NMCOG #642

APPLICANT: New England Power Company d/b/a National Grid

COMMENTS:
[✓ No significant environmental concerns]
______Need more information about the following environmental issues in order to comment: ______________________________
______I have significant environmental concerns. (Please provide any specific comments you may have below; attached additional sheets if needed)

Signature	Title/Dept.	Date
	DRAcut PuBlic works	9/17/15

The purpose of the Draft EIR is to present an analysis of the Project and its alternatives, and an assessment of its potential environmental impacts and mitigation measures. This information is used by the Secretary of Energy and Environmental Affairs to make a determination regarding the extent of the environmental impacts associated with the project. The Massachusetts Environmental Policy Act (MEPA) requires the Secretary to solicit local and regional comments prior to issuing a decision as to whether additional environmental studies are needed.